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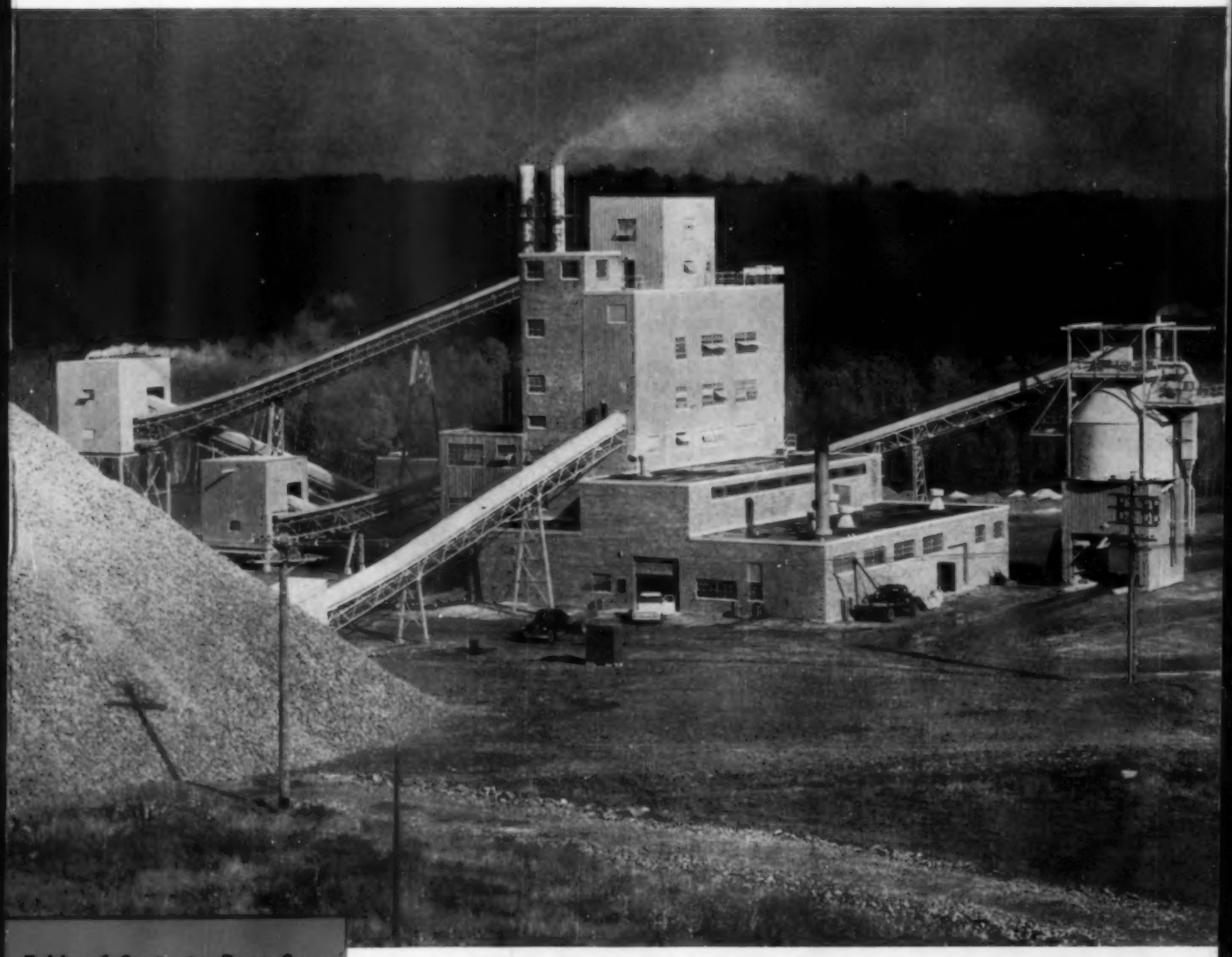
APRIL 1955

PIT and QUARRY



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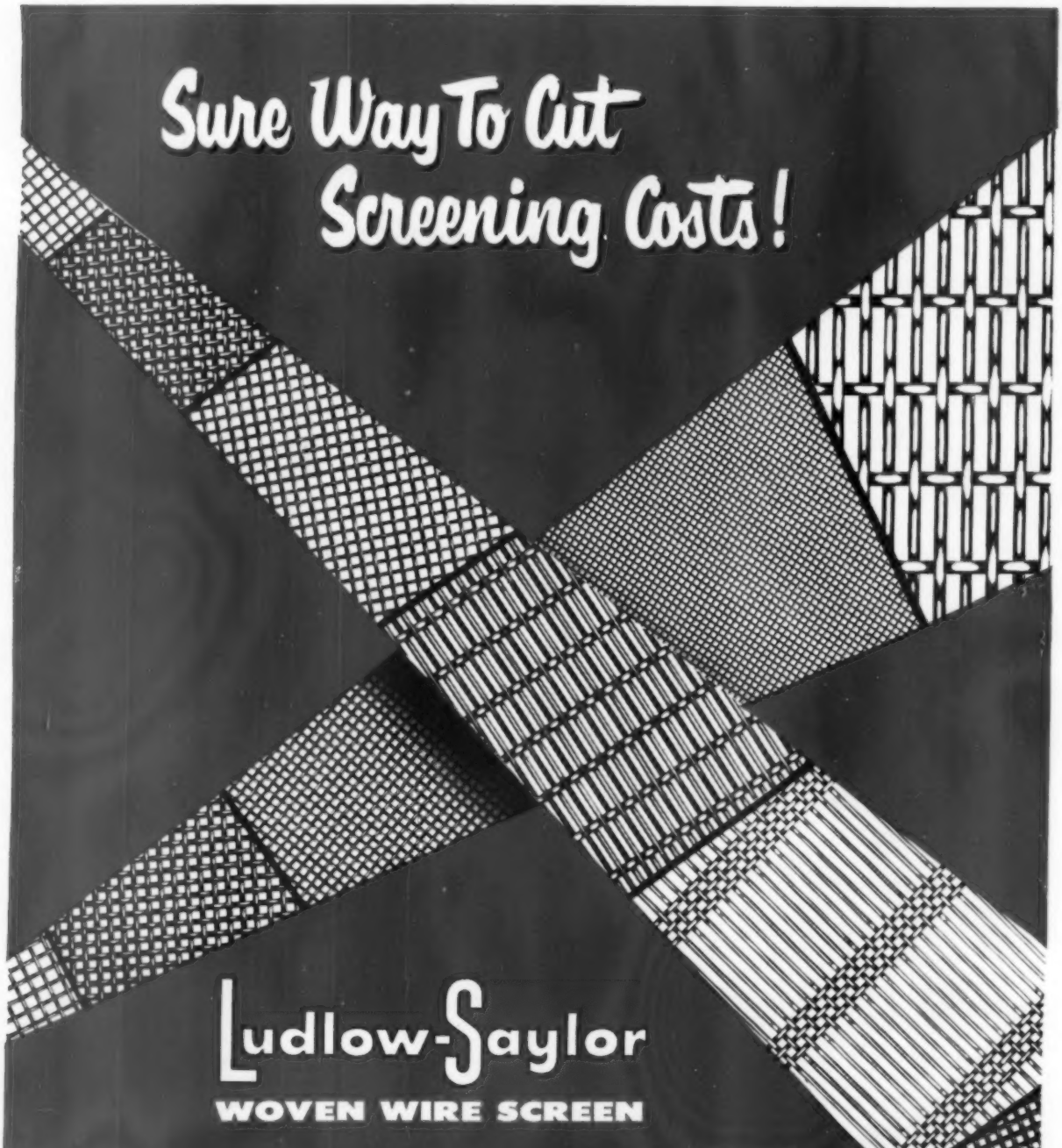

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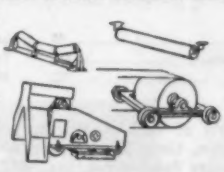

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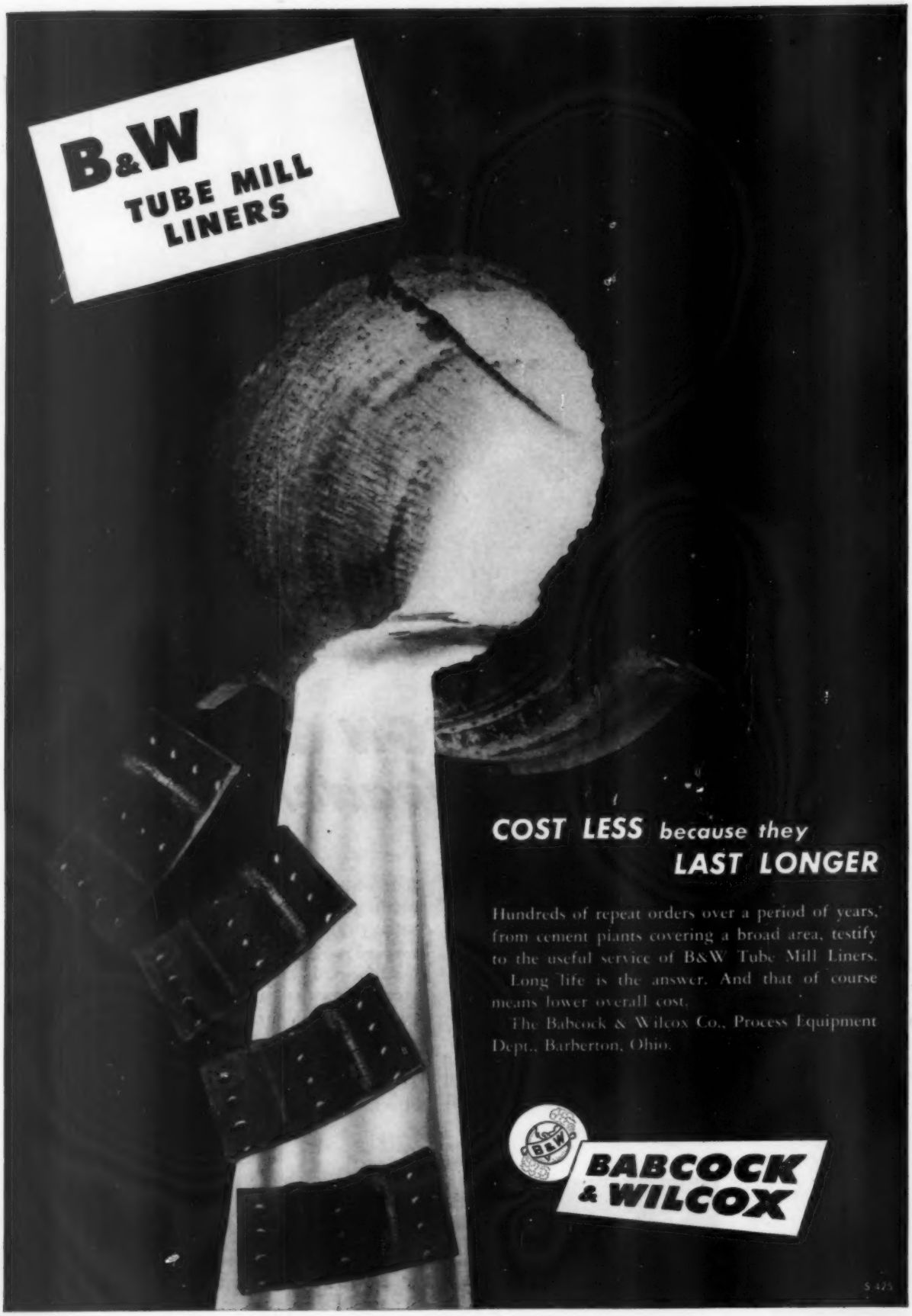
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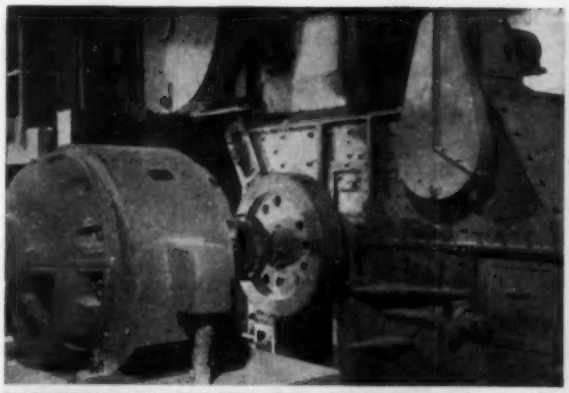

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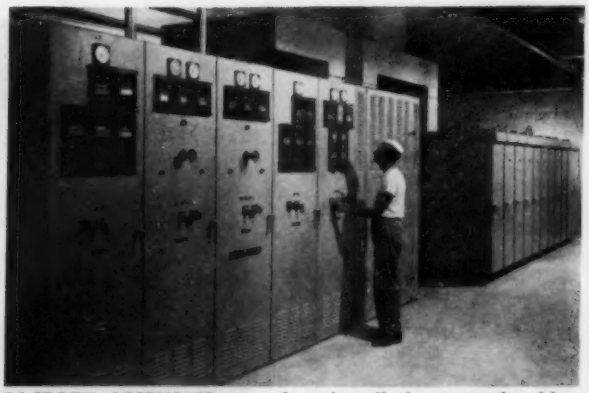

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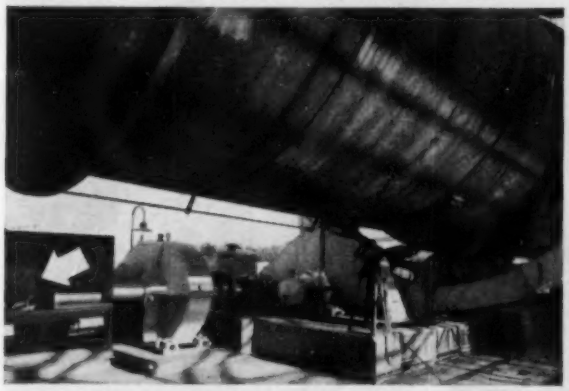

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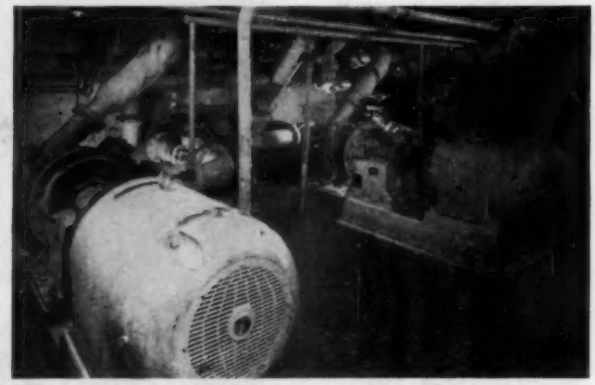

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New G-E electrical system plays key part in more than doubling capacity at Harleyville, S. C. plant

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G-E Application Engineers working closely with the Macdonald Engineering Company and Carolina Giant engineers designed and co-ordinated an over-all electrical system. It helped raise output from 800,000 barrels of Portland cement annually to 1,800,000 barrels. Utilizing many existing pieces of electrical equipment in this former alumina plant, new, more efficient distribution techniques were applied to the almost 100% G-E equipped new sections.

G-E Project Co-ordination carefully timed and followed up equipment deliveries to speed construction schedules, get production going sooner. Result: this enlarged wet process plant has been running smoothly 24 hours a day, 7 days a week.

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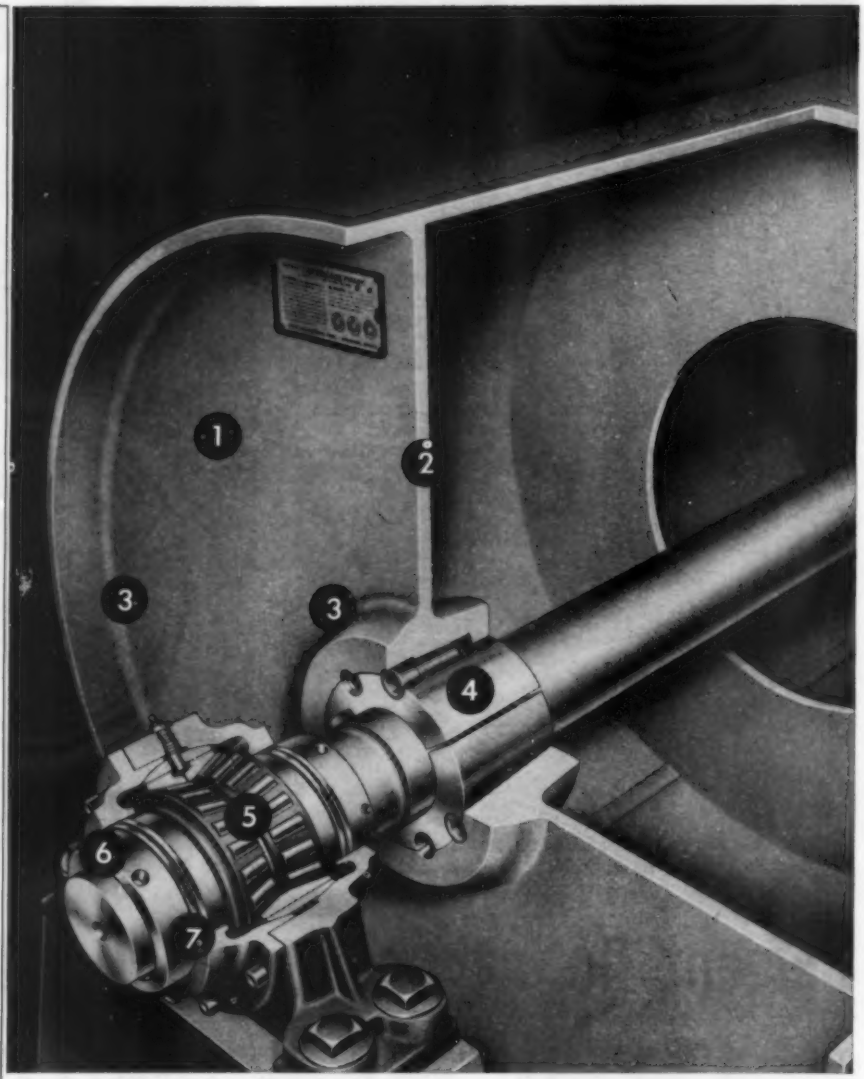

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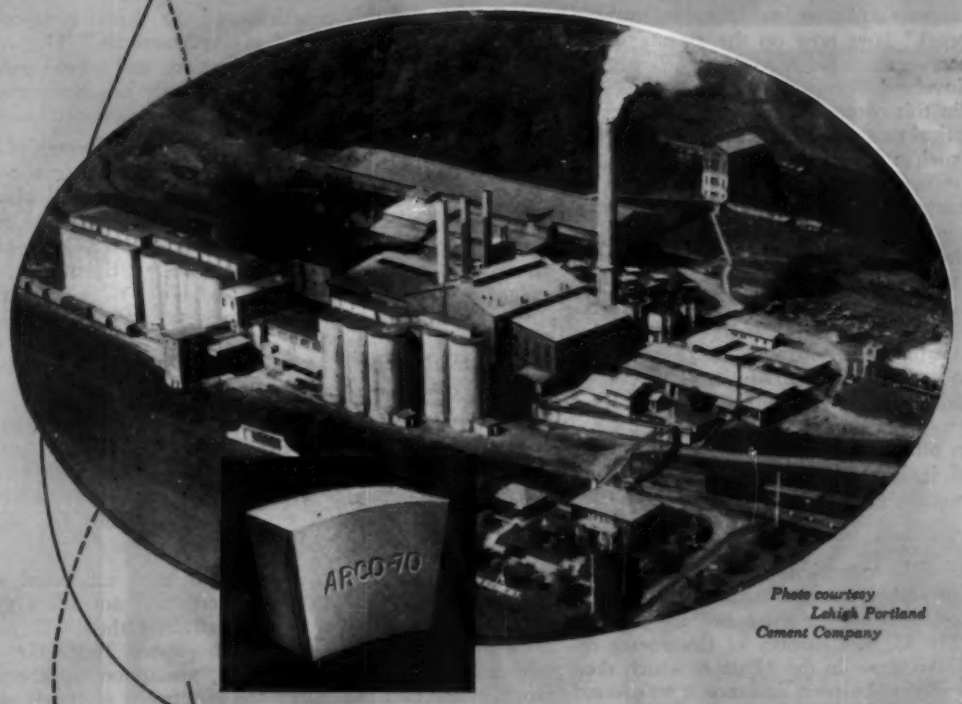

Photo courtesy Lehigh Portland Cement Company

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editorial

The Right-to-Work Laws

THE dispute between employers and labor unions over the "right-to-work" laws now on the statute books of 18 states becomes more bitter as time goes on, and the actual issues involved become more and more obscured. Both sides in this controversy have a tendency to submerge their practical motives and use moral arguments. The supporter of such a law may be motivated by the desire to break the unions through the prohibition of union shop agreements which make membership in a union a condition of employment; but he will usually emphasize the moral freedom of a worker to refuse to join a union. A union official, on the other hand, will attempt to justify his stand on the moral right of employers and unions to enter into a contract providing for "union security", when it is the security of the union—the organization—not the security of the workers, which concerns him. Actually, security for union officials through compulsory union membership can mean insecurity for the member. Union officials want monopoly control over all employees, and it is this monopoly that the state "right-to-work" laws are designed to prevent.

OPPONENTS of right-to-work laws charge that these laws are an "anti-labor weapon". All of the statutes make it illegal to refuse a worker a job because he isn't a union member. The U. S. Chamber of Commerce recently checked the labor laws in the 17 states which then had right-to-work statutes. In every instance it was found that these states also make it illegal for an employer to deny a worker a job or to fire him because he does belong to a union. Each of these states assures the worker of full freedom to make his own choice between union and non-union status. In 15 of the states, that assurance is in the right-to-work laws themselves, and in the other two it is in other statutes. In all of them the wording is such as to leave no doubt as to their meaning.

A fact seldom mentioned in this controversy is that all the 18 states' "right to work" laws now in effect could quickly be invalidated if Congress would scratch out one paragraph, Section 14-B, of the Taft-Hartley Act. This Act legalizes the union shop but says in Section 14-B that if states wish to outlaw the union shop, state law in this respect shall supersede the federal law. There seems to be little possibility that the Taft-Hartley law will be repealed or changed in the foreseeable future.

An important development is the recent formation of the National Right to Work Committee which is committed to defend at all levels an American citizen's right to hold a job without being forced to join a labor union. This committee was formed "to oppose a dangerous and revolutionary concept that has had frightening acceptance in America in recent years—that a free citizen must belong and pay dues to a private labor organization in order to be permitted to work and earn a living. It plans a national educational and informative program to point up the evils of this practice, and the threat it offers to the individual freedom of every American." The committee, it is stated, is not anti-union, and would defend a man's right to join a union voluntarily just as vigorously as it opposed his being forced to do so against his will.

The committee points out that "if one group of individuals organized into a private association can force other individuals to join them, on penalty of discharge from their jobs, other groups can do the same. Unless such union compulsion is checked and outlawed, it can't help but spread to the point of disaster. Eventually, the whole working force, now totalling over 60,000,000 people, more than two-thirds of whom now do not belong to a union, will find they are allowed to hold a job and earn a living only by permission of the leaders of private labor organizations."

An interesting thing about the committee is that its membership and its board of directors include many workers who have had personal experience with efforts to force union membership on them or who have suffered through strikes forced on them by unions for selfish purposes.

Employers whose plants are not now unionized may take the stand that this controversy will not affect them and is therefore none of their affair. Others will point out that only about one-fourth—about 16,000,000—of the nation's 64,000,000 workers, are union members in spite of the fact that, since the enactment of the Wagner Act in 1935, the right of workers to organize has been fully protected by law. This is a compelling argument against compulsory union membership as it points to the existence of many sound reasons for not joining the unions, as well as for joining them. What many do not realize, however, is that without right-to-work laws or other restraints the unions would spread rapidly and in time would dominate the very existence of workers and industry.

Right-to-work statutes have been in effect for some time in 11 southern states and in North Dakota, South Dakota, Iowa, Arizona, Nebraska, and Nevada. Recent attempts to repeal these laws have been voted down in Arkansas, South Carolina, North Dakota, and Tennessee. The Utah legislature recently became No. 18 by enacting a right-to-work law. The lone defeat was in Idaho, which recently rejected such a proposed law. Right-to-work laws are still at issue in at least 15 state legislatures and will come up in others. Every employer and every other person believing in these principles should work to enact or keep these laws, as the case may be, as union opposition to them is determined and unceasing.

Walter E. Trauffer

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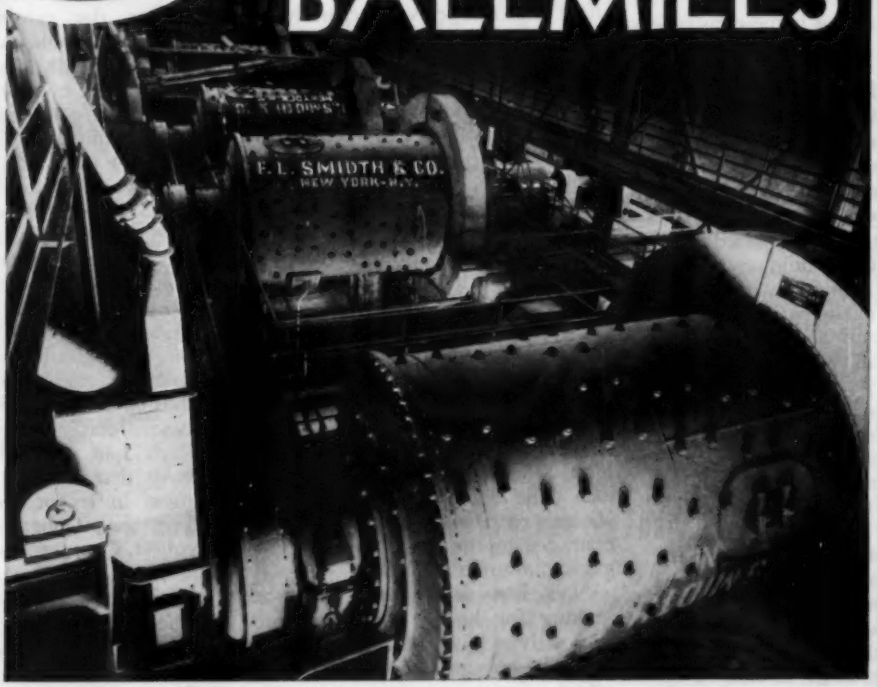

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Washington News Letter

Worry Over the Housing Market

A LARGE part of the credit for the economic recovery in 1951 has gone to the construction industry. Most of the construction industry's rise was, in turn, attributable to private residential construction. It is no wonder, then, that Washington is worried lest something may happen to the new housing market which would quickly reverse the upward trend. This might very well decide the next election.

The extent of the home construction post-war boom is shown in Table I below.

The 1,200,000 houses started in 1954 was a figure just below the 1,400,000 started in 1950, the all-time record year. But in every year since 1950 more than 1,000,000 houses have been started.

It is generally recognized that home construction would never have attained these heights without the government's participation through its Federal Housing Administration (F. H. A.) and Veterans Administration (V. A.) mortgage guarantee programs. It is this very fact which is giving Washington so much concern. The question being asked very loudly is, "How many more home mortgages can the government safely underwrite?"

In 1939 approximately 35 percent of the houses built were financed by F.H.A. guaranteed mortgages. Of course, there were no V.A. guarantees at that time. The proportion of government underwritten home construction in the subsequent years is shown in Table II.

It is important to note that the large rise in 1954 was accompanied (and probably resulted from) a rapid expansion in the proportion of housing starts which were government financed. This use is attributable almost entirely to the V.A. program. However, with the enactment of new housing legislation last summer, the number of F.H.A. applications has been rising very rapidly. This new legislation provided for F.H.A. guarantees on mortgages with up to 30 year maturities and permitted a higher proportion of the price to be covered by them.

If these guarantees were eliminated, there is little doubt that the housing market would collapse. Even a small restriction would probably affect that market very seriously. In fact, there is a fear that it will contract even if nothing is done to the government guarantee program.

This apprehension arises from the fact that new houses are being built more rapidly than new families are being formed. In 1954 new families formed were less than half of new housing starts.

The argument runs as follows: The post-war housing boom was inevitable because (1) a large backlog was built up during the depression which could not be filled until people had their war-time savings and income available to invest in housing, and because (2) new families were being formed immediately after the war at an unprecedented rate. The boom continued because income remained high. It was encouraged by the government's mortgage guarantee programs.

Now, however, most of the forces making for heavy home construction activity have worked themselves out. The only way to keep the boom going is for the government to make home buying even easier. Yet safe financing makes this almost impossible. Even now many homes are being bought with small down payments (or none at all) and the amortization is so slow that the house is likely to be worn out by the time the loan is paid off.

On the other hand, failure to support the very high level of home construction is to court economic disaster because home construction has proved itself the strongest support in a wavering economy. This is the economic argument.

There are also political arguments in favor of the government-supported home construction. The most powerful argument is that a large home-owning population is necessarily stable, sober, and hard-working. Home owners offer the best guarantee for the continuation of our democratic political institutions—and incidentally, for a continuation of the party in power.

It is this consideration which, no doubt, influenced President Eisenhower to favor the easier terms in the recently passed housing act and to say in his recent economic report, "The Federal Government should take additional steps to augment the facilities available for home ownership and improvement."

One of those steps was taken by the Housing Administrator when he went to Congress and asked for an additional $1,500,000,000 for the home mortgage insurance fund, which had been drawn down by heavy demand for mortgage guarantees in recent months. It is unlikely that Congress will deny his request. Congress, as well as the Administration, will wish to avoid taking the risk of a slump in home construction.

All in all, it looks as though new housing will be sold so long as people are willing to move out of the old house into a new shiny "rancher". The government will see to it that buying a house will be no more costly than renting.

"After all," the politicians in Washington are saying, "what better program could we have for the welfare of all the people?"

Table I
Total Private Non-Farm Housing Starts

Pre-war	1939	458,400	
Post-war	1947	845,000	
	1948	913,500	
	1949	988,800	
	1950	1,352,200	
	1951	1,020,100	
	1952	1,068,500	
	1953	1,068,300	
	1954	1,196,100	
Quarterly	1954—1st	929,600	
	2nd	1,306,000	Annual Rate
	3rd	1,357,200	Annual Rate
	4th	1,192,400	Annual Rate

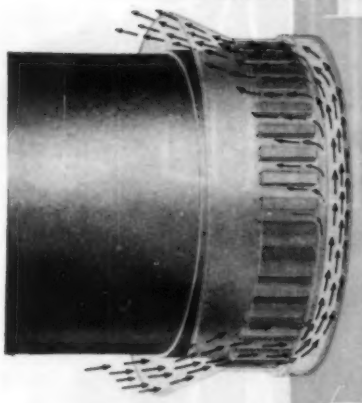
Table II
Percent of Government Underwritten Housing Starts

Pre-war	1939	34.0
Post-war	1947	52.0
	1948	43.4
	1949	47.4
	1950	50.8
	1951	40.4
	1952	39.4
	1953	38.2
	1954	48.7
Quarterly	1954—1st	39.4
	2nd	45.1
	3rd	51.0
	4th	57.4

Two Ways

You Can Reduce Operating Costs on Rotary Kilns...

1 Install an Air-Cooled Kiln End



No improvement you can make can cut your costs so much! Operating records show that an Air-Cooled discharge end will *pay for itself in 2 to 3 years* in refractory savings alone.

An Air-Cooled end circulates cooling air around the outside of discharge end and on underside of nose brick. Your kiln end stays cool, round and rigid — no warpage or end distortion.

You eliminate shutdowns required to replace end brick . . . gain valuable production time. Big fuel savings too — because Air-Cooled kiln end permits the use of a positive seal between firing hood and kiln.

2 ...and an Air-Quenching Cooler

Save on fuel costs! Save on installation costs! Save on power, maintenance and clinker grinding costs!

Air-Quenching cooler captures hottest air from cooling clinker at feed end. Movable baffle in the housing directs this hot secondary air directly to kiln. Clinker is cooled by a direct up-blast of cooling air. Fuel costs are sharply reduced.

Be sure to get your copy of new cooler bulletin, 07B7869. It shows how to figure how much an Air-Quenching cooler will save for you. Get it from the A-C representative in your area or write Allis-Chalmers, Milwaukee 1, Wisconsin.

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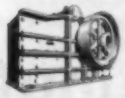

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Gyratory Crushers

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Whether you're exploring for new quarry sites or extensions of existing deposits, you'll wind up with the right information easier and faster by using the skid-mounted CP-8 and CP-15 Diamond Core Drills. Specifically engineered to withstand the continued high drilling speeds made possible by bortz bits, they're available with gas, diesel or electric drive — can be readily moved from hole to hole under their own power. Bolted frame permits easy disassembly for transportation to remote sites. With E-EX Fittings the CP-8 has capacities to 1250 ft., the CP-15 to 2250 ft. For information, write: *Chicago Pneumatic Tool Co., 8 East 44th St., New York 17, N. Y.*

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news of the industry

PIT AND QUARRY

John C. Best Retires From Natl. Gypsum Post After Distinguished Career

John C. Best, vice-president of National Gypsum Company, Buffalo, N. Y., and former president of Best Bros. Keene's Cement Company, retired from active service on February 28, 1955, according to an announcement released by Melvin H. Baker, chairman of the board.

Mr. Best was born in Yorkshire, England, where his father and grandfather were in the gypsum business. He was educated in England and came to this country as a young man, subsequently becoming an American citizen and serving in World War I.

He joined National Gypsum as vice-president of the Industrial Division in 1938, when National purchased the Best Bros. Keene's Cement Company plant and gypsum deposits at Medicine Lodge, Kans. The latter concern was founded by Mr. Best's father and his uncle in 1886.

Since 1941 Mr. Best has traveled widely throughout North America and has purchased 20 plants for National Gypsum.

From 1935 to 1946 he served as president of the Gypsum Association and during World War II he represented the industry on several government boards. He is also a vice-president of the A. M. Meincke Company and National Gypsum (Canada) Ltd., and director of the American Arbitration Association.

Quebec Lithium Corporation, Toronto, Ont., plans to build a $3,000,000 mill near Barraute, Quebec, to produce 1,000 tons a day of lithium concentrates. The deposits also contain large amounts of feldspar and glass quartz which the firm plans to develop.

John C. Best

With completion of a year-long expansion program at the Trinity Portland Cement Division, General Portland Cement Company, Houston, Tex., the capacity of the plant has been increased by 1,250,000 bbl. to 3,650,000 bbl. of cement annually.

Coming Events

April 18-20, 1955—Toronto. Annual general meeting, Canadian Institute of Mining and Metallurgy. Hotel Royal York.

May 11-13, 1955—Hot Springs, Va. 20th annual meeting, National Industrial Sand Association. The Homestead.

June 26-July 1, 1955—Atlantic City. Annual meeting, American Society for Testing Materials. Chalfonte-Haddon Hall.

General Portland Cement Plans $1,500,000 Expansion Of Signal Mountain Plant

General Portland Cement Company plans to spend more than $1,500,000 in an expansion and rehabilitation program at its Signal Mountain Division plant in Tennessee, according to an announcement released by Smith W. Storey, president of the firm.

Installation of a new 425-ft. kiln at the base of Signal Mountain is planned, as well as the development of a new quarry in the Bennett's Lake area on the Tennessee River to supply limestone for the plant. The new kiln will have a rated capacity of 1,250,000 bbl. annually which, when added to the Signal plant's present capacity of 1,500,000 bbl. annually, will bring the total to nearly 2,000,000 bbl. annually.

News of L. J. Boxley's Death Saddens Industry Members

Littleberry J. Boxley, 67, long active in the nonmetallic mineral industry, died recently after a short illness in a Roanoke, Va., hospital. Mr. Boxley had been appointed southeastern regional vice-president for the National Crushed Stone Association shortly before his death. News of his unexpected passing was announced at the recent N.C.S.A. convention in Cincinnati.

Mr. Boxley had served as president and director of the Blue Ridge Stone Corporation, the Trego Stone Corporation, and the Pounding Mill Quarry Corporation, and as vice-president and director of the Pembroke Stone Corporation — all of Roanoke. In addition, he was a member of the firm of W. W. Boxley and Company, and held office in several other businesses and organizations.

For many years he had been active in the affairs of the National Crushed Stone Association, and was a director at the time of his death.

February Building Totals Pass $1,500,000,000 Mark In 37 Eastern States

The Dodge Reports totals of contract awards for future construction in the 37 states east of the Rockies set new highs in February.

The total for the month was the highest for any February on record, and the January-February total likewise was the highest ever for the two months. The February figure was $1,581,143,000, up 29 percent over February, 1954, and 5 percent ahead of last January. The two-month total of $3,085,593,000 was up 30 percent over 1954.

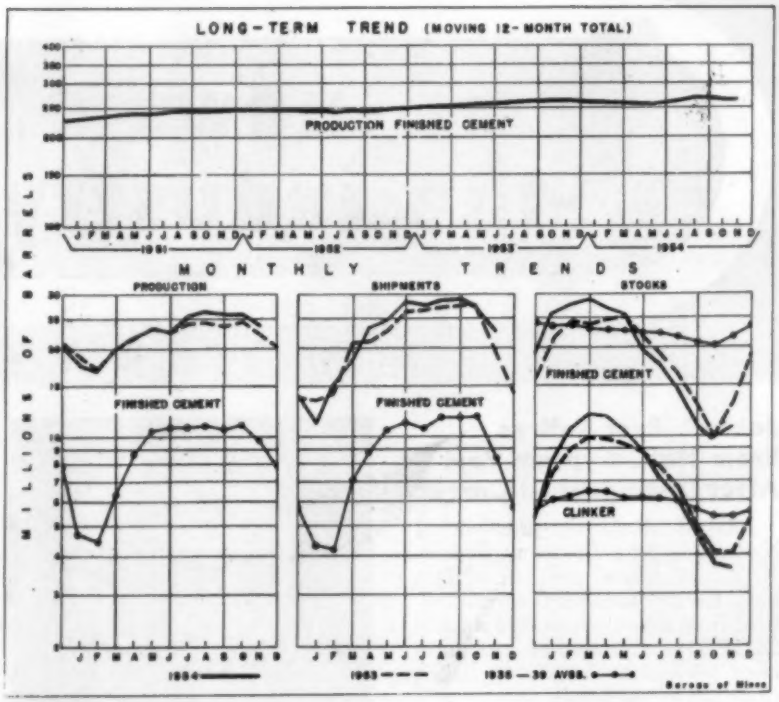
"So far the picture looks strikingly similar to last year, when the same two records were broken . . . ," commented Thomas S. Holden, Dodge vice-chairman.

"February was the tenth successive month of new monthly highs in the Dodge figures which go back 64 years. It would have been the fourteenth month had not last April fallen into second place among Aprils by virtue of enormous atomic energy contracts in a prior year."

Both non-residential and residential totals were the highest ever set in any February.

Detailed February totals were as follows: nonresidential, $534,463,000, down 5 percent from January but up 14 percent over February, 1954; residential, $744,102,000, up 8 percent over January and up 46 percent above February, 1954; heavy engineering, $302,578,000, up 21 percent over January and up 24 percent over February, 1954.

Individual two-month totals compared with the like period in 1954 were as follows: nonresidential, $1,099,251,000, up 17 percent; residential, $1,434,457,000, up 48 percent; heavy engineering, $551,885,000, up 20 percent.



SUMMARY—Production of finished portland cement in November, 1954, as reported to the U.S. Bureau of Mines, totaled 23,841,000 barrels—an increase of 6 percent over the November, 1953 figure, but a drop of 2,046,000 barrels from the October, 1954, total. Mill shipments totaled 22,781,000 barrels—17 percent more than in November, 1953, also a drop from the October figure, which was 27,133,000 barrels. Stocks of 10,720,000 barrels of finished cement on hand at the end of the month were 18 percent less than on the same date a year ago; in October stocks were 9,655,000 barrels. Clinker production during the month totaled 23,665,000 barrels—an increase of 5 percent from the November, 1953, total, but below the October total of 25,031,000 barrels.

PRODUCTION—One hundred and fifty-seven (157) plants located in 37 states and Puerto Rico reported a production of 23,841,000 barrels (25,887,000 barrels in October) of finished portland cement during November, 1954, compared to a production of 22,529,000 barrels in the same month of the preceding year.

SHIPMENTS—Mill shipments of finished portland cement were 17 percent higher than in November, 1953, and totaled 22,781,000 barrels, but fell far short of the October total of 27,133,000 barrels. Shipments were higher in 18 districts and lower in 2 districts, compared to shipments in November, 1953. Increases in excess of 30 percent were noted in the western Missouri-Nebraska-Oklahoma, Arkansas, Iowa, Texas, Puerto Rico, and Illinois districts, and nine other districts showed gains of 10 percent or more. The only districts showing lower shipments were Tennessee and western Pennsylvania-West Virginia, down 3 percent and 1 percent, respectively. Cumulative figures for the first 11 months of the year showed increased shipments in 17 of the 20 producing districts. Cumulative gains of 12 percent each occurred in the Texas and eastern Missouri-Minnesota-South Dakota districts, and of 10 percent each in the Colorado-Arizona-Wyoming-Montana-Utah-Idaho and western Missouri-Nebraska-Oklahoma-Arkansas districts. The greatest decrease for the January-November period was in the northern California district, where shipments were down 6 percent from those of the first 11 months of 1953.

Pit and Quarry Available To Libraries on Microfilm

All types of libraries are faced with the growing problem of providing adequate storage space for the flood of publications they receive. In an effort to help solve this problem PIT AND QUARRY several years ago entered into an agreement with University Microfilms to make available to libraries issues beginning with Volume 42 (July, 1949, through June, 1950) in microfilm form. Now Volumes 43, 44, 45, and 46 (through June, 1954) are also available.

By means of the microfilm process it is possible to produce and distribute copies of periodical literature with an entire volume in a single roll, at a cost approximately equal to the cost of binding the same material in a conventional library binding. Under the present plan, the library keeps the printed issues unbound, and circulates them in that form for from two to three years, the period of greatest use. When the paper copies begin to wear out or are not called for frequently, they are disposed of and the microfilm is substituted. Sales are restricted to those subscribing to the paper edition of PIT AND QUARRY, and the film copy is distributed only at the end of the volume year.

The microfilm is in the form of positive microfilm and is furnished on metal reels suitably labeled. Inquiries concerning purchase should be directed to University Microfilms, 313 N. First St., Ann Arbor, Mich.

The Wolcottville Sand and Gravel Company, Wolcottville, Ind., recently assumed control of the Indiana Sand and Gravel Company at Wolcottville.

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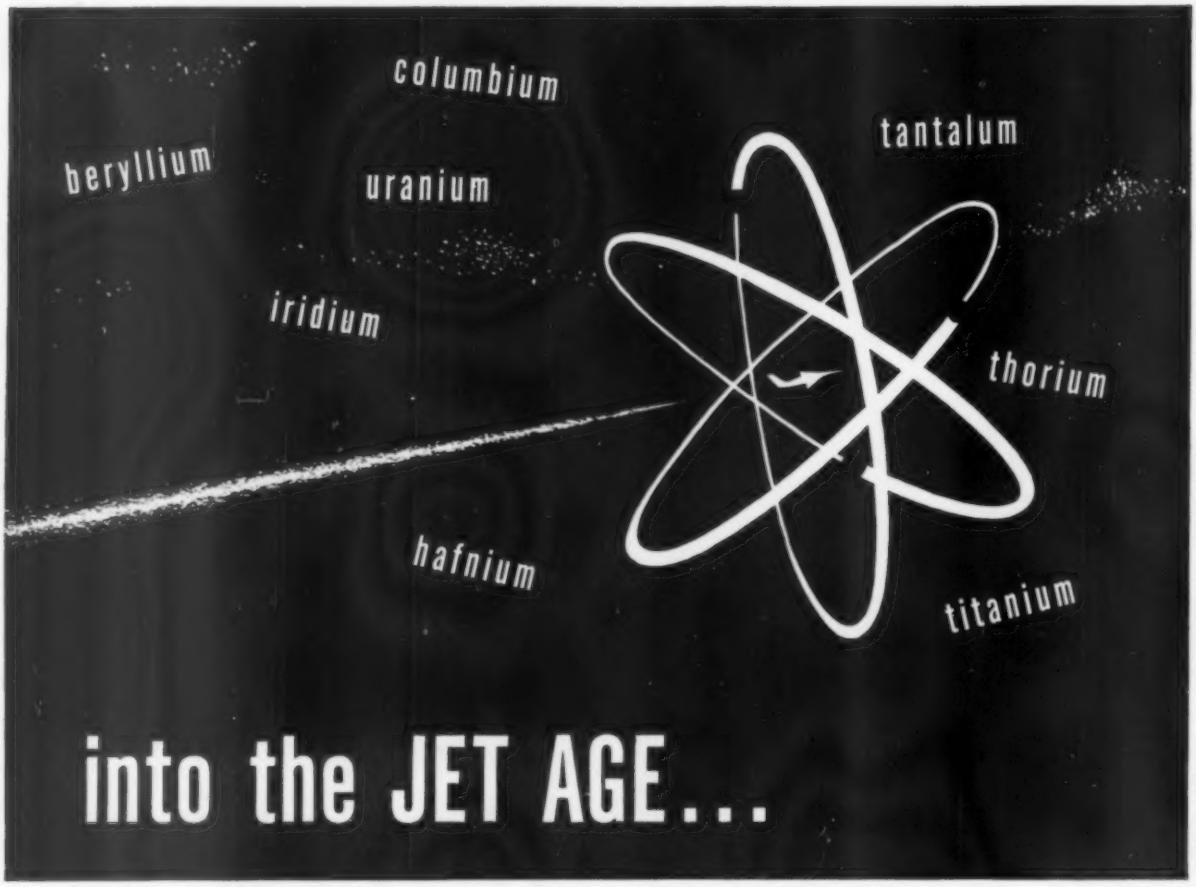

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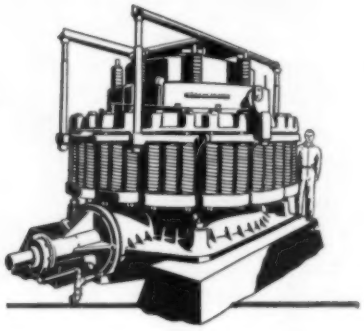
☆ As man crashes through the sound barrier, we find new words being used to describe the miracles wrought by today's men of science and research . . . words like *electronics—guided missiles—nuclear fission—transistors.*

Helping to make these scientific advances possible are the technical skills and vast experience of the mining industry, now being utilized to develop the rarer elements. Rocks and minerals formerly of no commercial interest have thus come into production . . . including *aplite, nepheline, syenite, olivine, perlite, pinite, topaz,* and many more.

Uses of these elements are numerous—ranging from modern construction to radar, sonar, and jet aircraft parts . . . but most of them have one thing in common . . . they are being processed by SYMONS® Cone Crushers—*the machines that revolutionized crushing practice.*

NORDBERG MFG. CO., MILWAUKEE, WIS.



SYMONS Cone Crushers are built in Standard, Short Head, and Intermediate types, with crushing heads from 22 inches to 7 feet in diameter—in capacities from 6 to 900 tons per hour.

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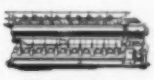
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WELDERS and PURCHASING AGENTS ARE GRABBING HOLD of the new U. S. ROYAL Gold Fluted Welding Cable

HERE'S WHAT WELDERS SAY:

"Easier to handle. It's so light and flexible I don't get the usual 'drag.' A cinch to handle in cramped quarters."

"I get easier grip. The *fluted* jacket does it. U.S. Royal Gold coils easily, resists kinks and tangles."

"Easier to see because of the bright yellow color. I don't trip over it. And I can easily tell it from the black cable whenever I have to use *two* cables on the machine."

"The *fluted* jacket has a greater surface area. That makes the cable cooler to handle, because heat is dissipated quicker."

HERE'S WHAT PURCHASING AGENTS SAY:

"Longer service life. U.S. Royal Gold is so flexible we get fewer failures at terminal connections. Maintenance costs go down, replacements are few and far between."

"Superior impact resistance. Tests show that U.S. Royal Gold Welding Cable possesses greater resistance to impact than conventional constructions. It shows up on my cost sheets."

"Lower accident insurance charges. U.S. Royal's bright yellow color catches everyone's eye. It also keeps workmen from running vehicles over it or letting equipment drop on it. Result: U. S. Royal Gold lasts even longer."

"It has high resistance to moisture—thanks to its 60% natural rubber jacket and its 60% natural rubber insulation."

Made exclusively by United States Rubber Company and available at your electrical supply house.

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E. J. Nunan Awarded Title Of "Engineer of the Year" By Engineering Society

Edward J. Nunan, materials engineer and sales manager of the Buffalo Slag Company, Buffalo, N. Y., has been named "Engineer of the Year" by the Erie County Chapter of the New York State Society of Professional Engineers. He is a former president of the chapter and a past-president of the state society.

Mr. Nunan holds many titles in professional and civic organizations. He was an assistant engineer in the New York (state) highway department before joining Buffalo Slag.

Sintering Machinery Corp. Acquired by McDowell Co.

Announcement of the acquisition of all assets, United States and foreign patents, goodwill, and the Dwight-Lloyd research facilities of Sintering Machinery Corp. was made recently by The McDowell Co., Inc., Cleveland, Ohio, industrial contractors and engineers.

Founded in 1920 by the inventors of the Dwight-Lloyd sintering process, Sintering Machinery Corp., Netcong, N.J., has long been active in promoting the use of the Dwight-Lloyd sintering process in the manufacture of lightweight aggregates.

Joining McDowell is virtually the entire executive, engineering, and research staff of Sintering. Included are Adolph F. Leitner, executive vice-president of Sintering, who is vice-president and director of the Dwight-Lloyd Division of McDowell; also Allen R. Rowen, a widely known figure in the industry. Patrick V. Gallagher, formerly with M. H. Treadwell Engineering Co., New York, is the chief engineer.

U.S. Sulphur Output in 1954 Shows Increase Over 1953

In December, 1954, the sulphur industry produced 477,909 long tons of native sulphur and approximately 32,200 long tons of recovered sulphur, according to reports of producers to the U.S. Bureau of Mines.

Output in 1954 totaled 5,515,543 long tons of native sulphur, and 357,400 tons of recovered sulphur, an increase of 7 percent in native and 6 percent in recovered over the previous year. Sales were approximately 4 percent less than production, and consequently producers' stocks at the end of the year showed an increase of 7 percent over that at the beginning of 1954.

Annual A.S.T.M. Meeting Set for June 26-July 1 Will Cover Wide Field

A wide range of subjects relating to research and testing of engineering materials will be discussed at the 58th annual meeting of the American Society for Testing Materials to be held at Chalfonte-Haddon Hall, Atlantic City, N. J., June 26 to July 1, 1955.

At least 30 sessions have been scheduled, beginning on Monday morning and continuing until Friday noon. Symposiums will be held on impact, judgment factors in soils testing, significance of tests of concrete, high purity water corrosion, speed of testing, and metallic materials for service above 1,600 deg. F. At other sessions individual papers will be given on soils, non-ferrous metals, steel, testing of materials, and fatigue. Forty-five committees and their subcommittees will hold a total of about 450 meetings.

This year the Edgar Marburg Lecture will be given by Dr. Walter J. Hamburger, director, Fabric Research Laboratory, Inc., Boston, Mass. Dr. Fritz V. Lenel, Renssalaer Polytechnic Institute, will give the Gillett Memorial Lecture.

Rubber-Type Streets Laid At Black Hills Resort Town

Rubber-type roads have spread to a widely-known tourist site at the base of the Black Hills with the completion of a re-surfacing job on the major business streets in Rapid City, S. D.

The new material used in the city's improvement program is called Rubarite, a free-flowing powder made of unvulcanized synthetic rubber and barytes mineral. Rubarite was mixed with asphalt and then spread in an average of 1½ inch thickness across ten of the main streets.

Rubarite is produced in Magnet Cove, Ark., by Rubarite Inc. This plant, the only one of its kind in operation today, is owned jointly by The Goodyear Tire & Rubber Company, The National Lead Company, and Bird & Son, Inc.

On January 1, 1955, Edmund Burwell Ilyus, consulting engineer of Roanoke, Va., combined his firm with that of Hayes, Seay, Mattern and Mattern, architects and engineers, 1615 Franklin Road, S.W., Roanoke, Va. This firm offers a wide variety of services, ranging from geological surveys through complete plant design.

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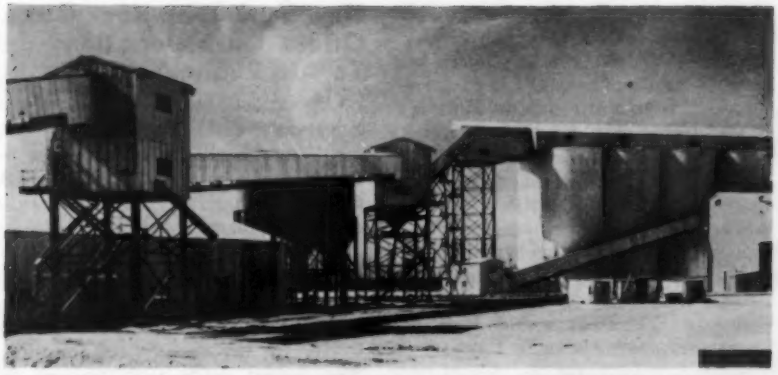

● At the phosphate rock storage plant for the Lake Charles (La.) Harbor and Terminals District, eight new concrete-stave silos (right) were erected recently. The 30- by 70-ft. structures have a total capacity of 40,000 cu. yd. This view also shows the conveyor system used for unloading the phosphate rock. The facility affords ready handling of low-cost Florida fertilizers and barytic ore to Southwestern farmers.

Federal Portland Cement Co. Purchased by Penn-Dixie

Purchase of the Federal Portland Cement Company, Buffalo, N. Y., by the Penn-Dixie Cement Corporation was announced on March 1. The amount paid by Penn-Dixie was not disclosed, but Federal's annual capacity of 1,800,000 bbl. places its facilities in the $10,000,000 bracket. (Penn-Dixie is estimated to be worth $30,000,000.)

Federal was purchased for cash from the Bessemer Securities Company of Youngstown, Ohio, which owns all of the firm's common stock. Bessemer is reportedly liquidating all its holdings, which include the Bessemer Limestone and Cement Company at Youngstown and the Peerless Cement Company. The latter concern operates plants at Port Huron and Detroit.

Synthetic Mica Corporation, a wholly-owned subsidiary of Mycalex Corporation of America, Clifton, N. J., has been organized and is building a plant in Caldwell, N. J. This marks the beginning of a new industry which eventually may reduce the dependence of the United States on India for mica. The estimated annual output of the plant will be 1,000 tons of high-grade synthetic mica, about 5 to 10 percent of the nation's current requirements.

California Associations Fete Colonel H. E. Peirce, British Trade Assn. Leader

At a dinner given recently by the directors of the Southern California Rock Products Association and the Southern California Ready Mixed Concrete Association the honored guest was Colonel H. E. Peirce, O.B.E., J.P., chairman of the Ballast, Sand and Allied Trades Association of Great Britain. (Colonel Peirce was the guest speaker at the joint luncheon of the National Sand and Gravel Association and the National Ready Mixed Concrete Association on January 11, 1955, in Miami, Florida.

About 40 persons attended the dinner at the Beverly Hills Hotel, Beverly Hills, Calif. Noel J. Redmond, president of the Southern California Ready Mixed Concrete Association and also president of the Blue Diamond Corp., presided.

During his tour of southern California, Colonel Peirce inspected many of the sand and gravel and ready-mixed concrete plants in the Los Angeles metropolitan area and also visited Las Vegas, Nev., to inspect the gypsum plant of the Blue Diamond Corporation.

● Needy and hospitalized veterans help themselves, but they need your help, too. Do your part during the week of Memorial Day by buying a Buddy Poppy. This sale is conducted by the Veterans of Foreign Wars, but the proceeds go to help all veterans.

Another Job Done Better With The ALL-NEW 'Jeep'®

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Beyond the road's end, where the going is rough and steep, you can depend on the sure-footed 4-wheel-drive pulling power of the Universal 'Jeep' to take you right to the job. With a 'Jeep' you can climb steep grades, maneuver your way in dense woods, traverse loose rock and sand—*and get there!* That is why the 'Jeep' has become essential equipment for engineers, surveyors, geologists, miners and lumbermen. Get a demonstration.

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THE WORLD'S MOST USEFUL VEHICLES

Garner, Lucas Appointed To New P.C.A. Posts In K.C., Omaha Districts

Harold G. Garner has been appointed district engineer of the Kansas City, Mo., Portland Cement Association office, and Kenneth B. Lucas

Harold G. Garner

has been appointed district engineer of the Omaha office, according to an announcement by G. Donald Kennedy, association president.

Mr. Garner succeeds Edward J. Mueller, who is retiring from the association. Mr. Lucas succeeds Mr. Garner at Omaha.

A graduate of the University of Missouri, Mr. Garner was a division soils engineer for the Missouri State Highway Department from 1930 to 1940. He joined the Portland Cement Association in 1940 as a soil-cement engineer with its Omaha Office. In his new position he will direct association activities throughout Kansas.

Mr. Lucas is a graduate in civil engineering of Kansas State College of Agriculture and Applied Science. Prior to joining P.C.A. in 1947 he was employed for seven years in various capacities with the State Highway Commission of Kansas and for two years as a construction engineer with the Kansas Gas and Electric Company.

Kenneth B. Lucas

International Minerals Wins Canadian Potash Rights

International Minerals & Chemical Corporation, Carlsbad, N. M., has become the third American company seeking to develop extensive potash beds in Saskatchewan, Canada.

The Saskatchewan Government recently granted six potash withdrawal areas to International Minerals, which now may explore tracts totalling 600,000 acres in the Yorkton and Quill Lake area.

Other American companies which have exhibited interest in this area are the Potash Company of America and the Duval Sulphur & Potash Company.

Officials of Shelby Gravel Inc., recently announced the purchase of the W. P. Wolfal Company, both of which are located near Rushville, Ind. The new division of Shelby Gravel will be known as the Rushville Ready-Mix Company. Thomas J. Wheeler has been named manager of the plant; there will be no changes in the other personnel of the plant.

Cover Picture . . .

● On our cover this month is the modern and efficient new quartzite crushing and screening plant of the Minnesota Mining and Manufacturing Company near Wausau, Wis. This plant does all of the preliminary preparation of the materials for the company's roofing granules plant in Wausau. This new plant has all the necessary provisions for automatic control and operation and for the health and comfort of the employees.

New York Trap Rock Corp. Offers Cash Donations To Aid Public Schools

Officials of The New York Trap Rock Corporation, New York, N.Y., have announced that this concern is offering cash gifts to school districts in which it operates, in a move "to raise the general excellence of teaching in the public schools."

The amount of the gifts will depend on the concern's annual profits, and will be in addition to the taxes it pays in the various communities. The initial offer will amount to about 10 percent of taxes paid last year.

The company has a quarry at Clinton Point, near Poughkeepsie; plants in Haverstraw and Tompkins Cove in Rockland County; a plant at Verplanck, near Peekskill, and a shipyard in Newburgh.

The gift will be made available about January 15 each year, according to W. P. Foss, president, who stated that the money is to be used only for raising teaching standards, and not for regular budgetary expenditures. Suggested uses were benefits for teachers now in the school system, including sabbatical leaves; employment of competent professional leaders to conduct work shops; leaves for educational travel; and aid to teachers taking advanced courses and specialized training.

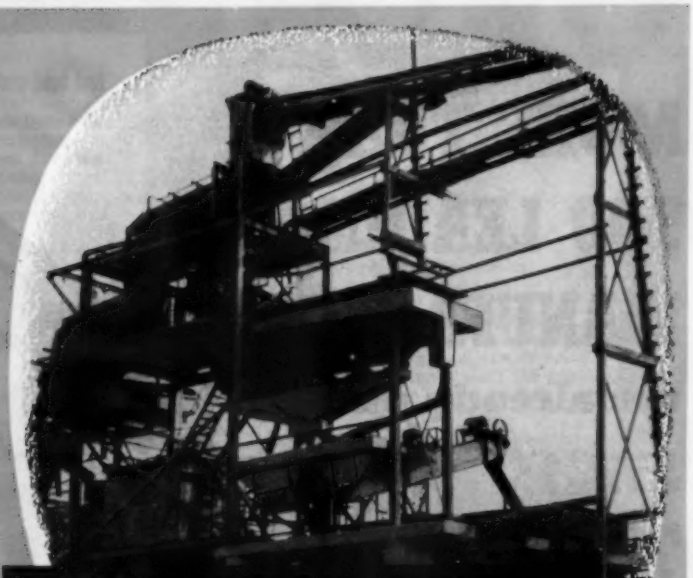
Calaveras Adds $545,000 To San Andreas Expansion

Calaveras Cement Company directors approved on February 3 an additional $545,826 expansion program for its San Andreas plant, bringing the total of the company's commitments for plant improvements to $1,169,297 since November, 1954.

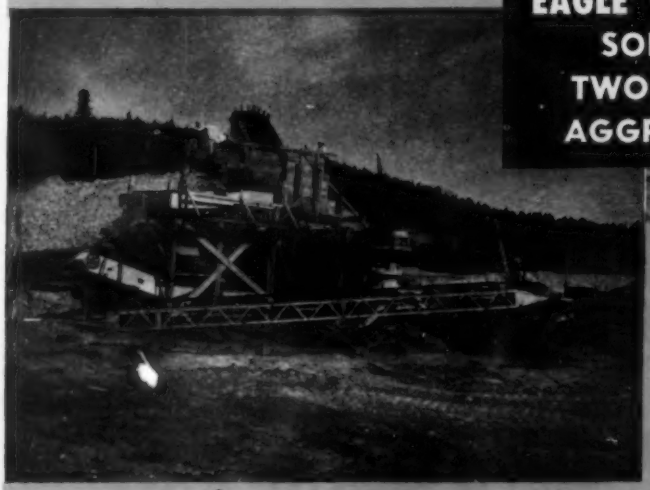
Provision for increased clinker storage, new separators and elevators in the finish mill, and four new cement storage silos are included in the new project. These additions will increase the plant's effective capacity about 5 percent. The program announced in November, which includes quarry, plant, and shipping department improvements, is already well under way.

Relocation of the plant of the Marin Rock and Asphalt Company (formerly the Marin Gravel Company, Point Reyes, Calif.) to its new site at Novato, Calif., has been completed. Operation of the $500,000 plant is scheduled to begin in April. The company is owned and operated by Marion Bottini and H. C. Phillips.

GOOD NEWS travels fast . . . word's getting around that a *modest investment* in Eagle Aggregate Washing-Classifying-Dehydrating Equipment can lick the dirty, unacceptable material problem and enable a producer to provide blends of sand to meet strict specifications. A number of sand and gravel firms in the Northwest have been producing high quality materials, much in demand, since installing Eagle units. Chalk up two more on the growing list.



EAGLE WASHERS-CLASSIFIERS SOLVE PROBLEM FOR TWO MORE NORTHWEST AGGREGATE PRODUCERS!



Associated Sand & Gravel Co., Everett, Wash., is thoroughly washing and classifying material with a 24' single Eagle Water-Scalping-Classifying Tank equipped with 2-cell collecting-blending flume, which discharges into a 24" dia. x 18' fine material, double screw unit.

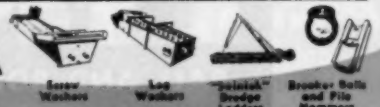
Pacific Sand & Gravel Co., Centralia, Wash., uses Eagle equipment profitably at several plants. Plant shown is temporary set up to take care of a contract. Eagle units consist of 16' Water Scalping-Classifying Tank and 24" dia. x 22' single screw, fine material washer-classifier-dehydrator. The clean material produced readily meets contract specifications.

It's "good riddance" to Aggregate Washing-Classifying Worries When You Call In Your Factory-Trained **EAGLE EQUIPMENT DISTRIBUTOR:**

He will show you how to get your washing-classifying job done with minimum investment. He will see that you get satisfaction and service—backed by the entire Eagle organization. He will give you the benefit of our vast experience and field study. Let us put you in touch with him.

EAGLE IRON WORKS
133 HOLCOMB AVE., DES MOINES, IOWA

EAGLE IRON WORKS
EXPERIENCE-PROGRESS-SERVICE SINCE 1872



MORE THAN 300 LEADING MANUFACTURERS

are already putting

SKF TYPE "C" BEARINGS

in their products

Here are the trade marks of a few of more than 300 leading manufacturers – companies who want extra bearing performance – who already are using the *improved* SKF Type "C" Spherical Roller Bearing announced less than a year ago.

There are two reasons why

First: They know that for over 40 years, SKF has been *first* with anti-friction developments that *work*.

Second: They obtain, size for size, up to 50% more capacity, 2 to 3½ times increased life with SKF's Type "C" Spherical than they can obtain with any other available design, and at no increase in cost.

7510

SKF INDUSTRIES, INC., PHILADELPHIA 32, PA
– manufacturers of **SKF** *and* HESS-BRIGHT® *bearings.*

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SKF®
BALL AND ROLLER BEARINGS

Less surface area, less heat lost

Rounded exclusive Power-Dome combustion chamber has less surface area than irregular chambers. Thus less heat is dissipated into cooling system, more heat is utilized within the chamber to expand gases more fully, give greater thrust to piston.

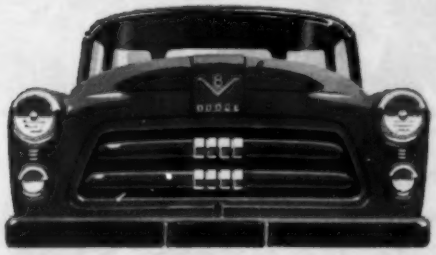
Dodge avoids power-stealing hot spots

Power-Dome combustion chambers are rounded, have no corners or pockets in which carbon deposits can build up. Such deposits become red-hot, pre-ignite the fuel-air mixture, cause engine knock and loss of power, lead to costly repairs.

Short flame travel, better valving

With Power-Dome combustion chambers, the spark plugs are located at or near the center. Thus the flame has a shorter distance to travel, combustion is more even. Large unrestricted valves mean better "breathing" and greater efficiency.

How you get more power, use less gas with POWER-DOME V-8 truck engines!



Truck owners everywhere report more power and less fuel consumption with new Dodge Truck Power-Dome V-8 engines. AAA-supervised tests *proved* the power of Dodge Truck V-8's in a history-making Pikes Peak climb . . . proved the economy of Dodge Truck V-8's in a sensational 22-mile-per-gallon Economy Run.

Look at the pictures and captions shown on this page—then, for further details and an eye-opening road test, see your dependable Dodge Truck dealer!

DODGE "Job-Rated" TRUCKS

A PRODUCT OF CHRYSLER CORPORATION

12,587 carloads of

American Steel & Wire
Room 842, Rockefeller Building
Cleveland 13, Ohio

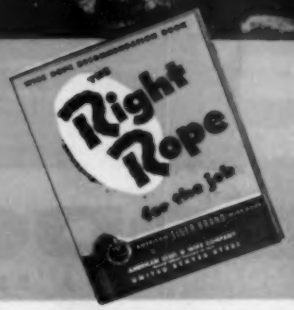
FREE ROPE BOOKLET →

Please send me, without obligation, a copy of your booklet, "The Right Rope for the Job," which lists the correct Tiger Brand Ropes to use for hundreds of typical applications.

Name.....

Address.....

City & State.....



overburden moved with one Tiger Brand Hoist Rope

IMAGINE 12,587 50-ton freight cars strung out end-to-end. They would make a train more than 80 miles long; and if each car was level full, the entire train would contain 1,000,000 cubic yards of material. That's how much overburden this big coal stripping shovel moved with one American Tiger Brand Hoist Rope.

Despite hard digging, a 2⅜" Tiger Brand Wire Rope lifted and lowered the fully loaded 45 cu. yd. bucket *20,000* times before it had to be replaced. This equipment is used by Central Ohio Coal Company which supplies coal for The Ohio Power Company's new Muskingum River electric power generating plant. This company also uses Tiger Brand Wire Rope on its 18 cu. yd. shovels.

You will like Tiger Brand, too. It lasts long in *any* type of service.

Send the coupon for our recommendations of the right rope to use on your machines.

Regular lubrication of sheaves helps prevent excessive wear of the Tiger Brand Ropes on these big machines.

This 18 cu. yd. electric shovel and the 45 cu. yd. job shown on the opposite page are stripping overburden 3 shifts a day *every* day at Central Ohio Coal Co.'s big Muskingum Mine near Zanesville, Ohio. Tiger Brand Rope is giving excellent service on both these hard-working machines.

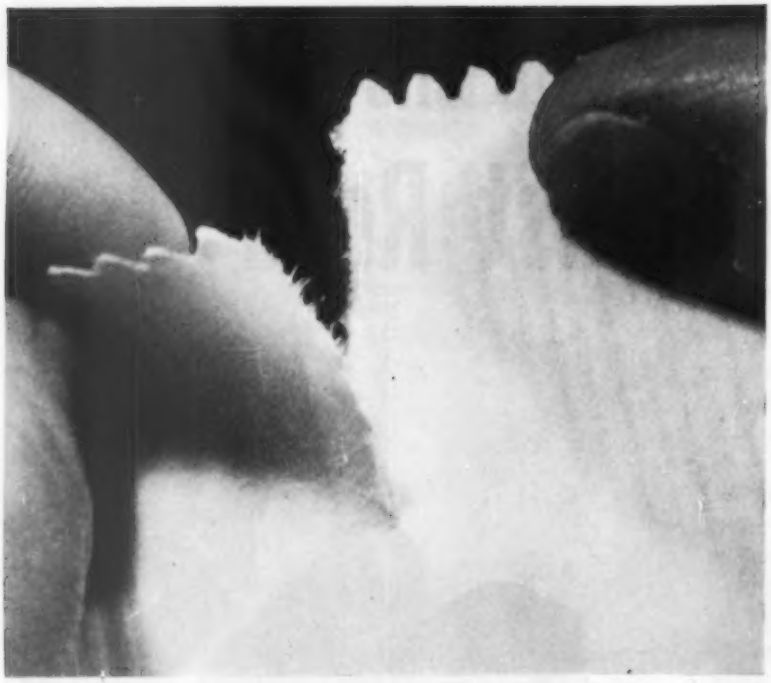
AMERICAN STEEL & WIRE DIVISION, UNITED STATES STEEL CORPORATION
GENERAL OFFICES: CLEVELAND, OHIO
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO · TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA., SOUTHERN DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

U·S·S AMERICAN TIGER BRAND WIRE ROPE

Excellay Preformed

USS

UNITED STATES STEEL



T-P EXTRA LONG FIBERS MEAN BETTER PAPER SACKS

volume bag users find Thomas Phillips TUFFPAK sacks tougher, better built at no extra cost . . .

Having breakage trouble in your shipping sacks? Why continue with standard quality when T-P TUFFPAK is available at no extra cost? TUFFPAK is made by a special Thomas Phillips process that gives each square inch of paper more and longer fibers.

These extra strength papers are carefully made into paper shipping sacks that mean less loss during filling, shipping and warehousing.

If your breakage is running above normal, why not let a Thomas Phillips representative demonstrate TUFFPAK in your plant? There's no obligation.

TUFFPAK is made into bags from 2 to 100 lb. capacities, Sewn or Pasted Open Mouth, Sewn or Pasted Valve, one to five walls.

BAG USERS: SEND FOR LATEST BROCHURE

THE THOMAS PHILLIPS COMPANY
AKRON, OHIO

California Perlite Corp. Leases Mine and Plant To Great Lakes Carbon

The Great Lakes Carbon Corporation, Perlite Division, has leased (with an option to purchase) all properties of the California Perlite Corporation, including its perlite mine and plant facilities, according to an announcement released jointly by DeOtis Loring Marlett, vice-president of Great Lakes Carbon and general manager of its Perlite and Dicalite divisions, and Vincent A. Davi, president of California Perlite. Transfer of operation and management became effective on March 1.

California Perlite's mine and plant are located at Klondike, Calif., about 170 miles from Los Angeles. Perlite ore from this mine is recognized as the best quality ore available on an economic basis to the West Coast market. Its plant is the newest in the industry, having been completed less than two years ago.

Great Lakes Carbon will operate the new perlite mine and plant, utilizing existing equipment and personnel, and will ship the ore from this location to customers of both companies. Great Lakes Carbon plans to expand its Permalite franchise system throughout the West Coast market area, to sell ore to companies not embraced by its franchise system, and to participate in development of existing and new markets for perlite products.

Carey Mfg. Co. to Develop Quebec Asbestos Deposit

Plans to spend $7,500,000 for development of a newly discovered abestos deposit near East Broughton, Quebec, have been announced by the Philip Carey Manufacturing Company, of suburban Lockland (Cincinnati), Ohio.

Carey officials said that the type of asbestos fiber is comparable to that now being produced at another mine at East Broughton, but that the tonnage is expected to be much greater.

Harris N. Snyder, who headed the Federal Portland Cement Company of Buffalo, N. Y., until the firm was purchased by the Penn-Dixie Cement Corporation, has relinquished his post as president of the former. He will continue to serve as president of the Buffalo Slag Company (Buffalo) and the Federal Crushed Stone Company. Mr. Snyder is a director of an allied concern, Bituminous Products, Inc.

THE GREATEST NAME IN ELECTRICAL WIRE AND CABLE

Every type in the completely new line of SUPER SERVICE resists impact, crushing and cutting far beyond accepted field requirements. Special cord reinforcement provides vital extra tensile strength and increases wear. SUPER SERVICE needs less replacement.

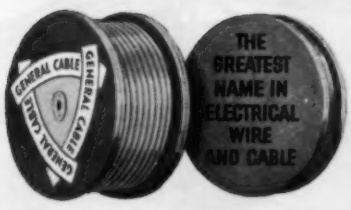
LOOK AT THESE FEATURES:

SUPERTUF — General Cable's new mold cured jacket — is free from ply separation, resists tearing and abrasion. New, more compact design prevents sleeving of the jacket from the core. Flame resistance far exceeds requirements of the Federal Bureau of Mines. New SUPER SERVICE meets all IPCEA Specifications.

THERMAX heat resistant insulation, another SUPER SERVICE improvement, provides top protection against temporary current overloads and extends the operating life of the cable.

Result: a well balanced product that performs better and lasts longer. Why settle for less! Remember — General Cable is the only manufacturer able to fill *all* your wire and cable needs. It pays to buy in one place!

GENERAL CABLE
CORPORATION



BARE, WEATHERPROOF, INSULATED WIRES and CABLES FOR EVERY ELECTRICAL PURPOSE

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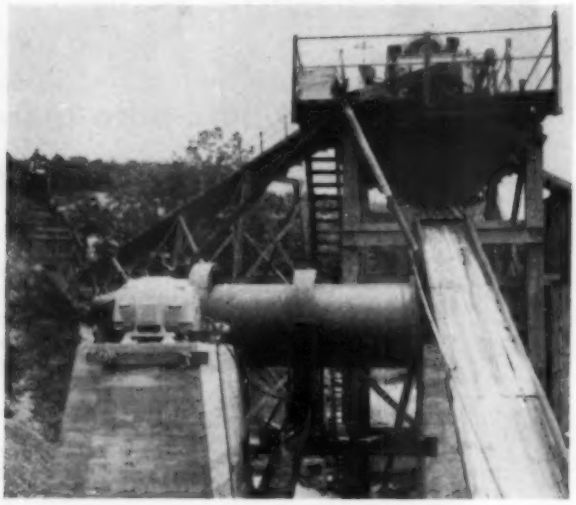
KENNEDY

noted for..



KENNEDY 4' x 10' CENTER DISCHARGE ROD MILL FOR SPECIFICATION SAND AT FRANK M. SHEESLEY CO. KUNKLETOWN, PA.

ONE OF TWO KENNEDY 5' x 12' CENTER PERIPHERAL DISCHARGE ROD MILLS AT REFRACTORY SAND CO., ANDREAS, PA.

- ROD - MILLS

.....low maintenance and exact specifications in manufacture of SAND

See what Mr. Neal McMullen, manager of Frank M. Sheesley Co. reports on KVS Rod Mills:

"We are one of the very few Companies in our area capable of making sand to the rigid Turnpike specifications. Our KENNEDY Rod Mill is, in large measure, responsible for this ability to produce and hold gradation. We investigated thoroughly before buying and are now certain it pays to own the best."

KVS Rod Mills built to perform a specific, and important, function...producing a grade of sand to meet rigid specification. These mills not only meet these requirements, they continue to make sand of a *uniform grade*, economically and without costly maintenance.

Whether your pulverizing and grinding problems involve sand, cement, lime or coal, KVS has the equipment you need that is best suited for the job—KVS sales-engineers are available for consultation anywhere—anytime!

Let us run a KVS Rod Mill test on your material.

WE'LL PROVE TO YOU THAT....

IT COSTS LESS TO OWN THE BEST!

SEND FOR BULLETINS DESCRIBING KVS MACHINERY AND EQUIPMENT.

KENNEDY-VAN SAUN

MANUFACTURING & ENGINEERING CORPORATION

TWO PARK AVENUE · NEW YORK 16, N. Y. · FACTORY: DANVILLE, PA.

N.S.G.A. Releases Manual
To Promote Safe Driving

A POCKET-SIZE *Driver's Manual* drawn up for the National Sand and Gravel Association was recently released. This interesting and helpful booklet is available to member companies at a cost that is less than the out-of-the-pocket expense incurred by the association. It was compiled under the supervision of Edward P. Pearsall, formerly publications manager for the Dravo Corporation of Pittsburgh, Pa.

The manual covers the fundamental points of good relationships between employers and the men who have the important job of driving their trucks over city streets and highways. The interest and eye of the drivers is caught and held by amusing cartoons and brief, pointed messages which clearly convey the basic dos and don'ts of driving courtesy.

First of all, the driver is reminded of the responsibility he owes to the company which employs him; he is also told that without the good will of the community, both he and his employer will be the losers. His general duties are outlined and his obligation to keep his truck in good operating condition is stressed. Above all, he is reminded that he is a professional driver and is supposed to be a better driver than most that he meets on the road.

Maintaining good public relations is a difficult, sometimes intangible, art; but it is one which must be cultivated. In the sand and gravel industry it is an art which must be especially pursued since public good will is many times an essential for the very existence of operations. This manual carefully points out the fact to the driver that every person he encounters on the roads is a potential customer and that, to the other driver, he is a *bona fide* representative of the concern's method of operating. It is stressed that if his truck is dirty, if it drops material on the streets, and if he acts in a discourteous and overbearing manner while driving, the people who share the road with him are apt to attribute these characteristics to the firm for which he works—much to the detriment of his employer and, of course, ultimately his own.

These colorful manuals are available to members at the following rates: 25 copies or less, $1 each; additional copies, 75 cents each. The name of the concern may be imprinted inside at a cost of $5 for the first 25 copies and 10 cents for each additional copy. Further information may be obtained by writing the National Sand and Gravel Association, 1325 E St., N.W., Washington, D. C.

Dragon Cement Company May Build $10,000,000 Plant

Plans are under consideration for the construction of a $10,000,000 cement plant for the Dragon Cement Company in West Stockbridge, Mass.

According to James H. Ackerman, president of the firm, Dragon will probably build the plant; however, the final decision depends upon three considerations: whether adequate supplies of limestone are found upon the property; whether governmental bodies will co-operate in granting necessary permits; and whether cement demand will continue high.

The proposed facilities would be located between the stateline junction of the Boston & Albany and the New Haven Railroad lines south of Richmond, where an option has been obtained on approximately 1,500 acres by a Pittsfield law firm.

Airseal Insulation Replaces Former Rock Wool Operation

With the formation of a new company—Airseal Insulations, Inc.—the manufacture of rock wool at the Federal Portland Cement Company, Buffalo, N. Y. (recently purchased by the Penn-Dixie Cement Corporation), became an independent operation. This branch of Federal was started in 1944.

Ronald E. Daniels, vice-president of Federal, will be president and treasurer of Airseal. He will be assisted by J. Francis Hanssel, vice-president and secretary, and George R. Lentz, vice-president in charge of production.

Newly Established Company To Mine Potash in N. Mexico

Freeport Sulphur Company and Pittsburgh Consolidated Coal have formed a new concern, the National Potash Company, to develop potash from a large deposit near Carlsbad, N. M.

Richard C. Wells, vice-president and controller of Freeport, will be president; and Thomas G. Ferguson, of Pittsburgh Consolidated, will be operating vice-president of the new firm. The project, including mine, plant, and related facilities, will require an estimated capital outlay of $19,000,000.

WILLIAM B. WEAVER JR., vice-president of J. P. Morgan & Company, has been elected a director of the Whitehall Cement Manufacturing Company.

"He's hogging the whole road—is that a sand-hog, dear?"

IN CASE OF ACCIDENT

Here's one page we hope you'll never have to read. But, just in case you do have an accident, there are several things that should be done:

1. See that injured people are attended to at once.
2. Call the office immediately
3. Get names and addresses of any witnesses.
4. If you can, have the other driver or party fill out the "Driver's Exoneration Form."
5. Do not sign anything.
6. Do not discuss the accident with anyone except a policeman or an authorized insurance man.
7. Admit no liability

"After 20 years of driving I finally have to read that page, 'In case of accident'"

● Two eye-catching pages from the N.S.G.A. Driver's Manual.

IN CALIFORNIA . . . AND THE WORLD OVER

In this quarry at Colton, the powerful 150-B shovel with its 6-cu. yd. dipper has no difficulty in breaking through tough limestone.

Rock meets its master

WITH A BUCYRUS-ERIE SHOVEL ON THE JOB

In a California quarry, this Bucyrus-Erie 150-B shovel is digging and loading hard limestone, delivering outstanding output. This performance story is being repeated daily in quarries, mines and on heavy-duty construction projects throughout the world.

New front-end design, extra-strong construction, and advanced engineering of Bucyrus-Erie Ward Leonard electric excavators give owners that extra margin of output that pays off in profits.

35155C

GLOBAL APPROVAL

MOROCCO · PHILIPPINES · RHODESIA · UNITED STATES · VENEZUELA · ALGERIA · INDO-CHINA · FRANCE · FINLAND · ENGLAND · CONGO · CANADA

110-B 4½-cu. yd.
150-B . . 6-cu. yd.
190-B . . 8-cu. yd.

BUCYRUS ERIE

Bucyrus-Erie Company

South Milwaukee, Wisconsin

30 years ago in Pit and Quarry

By WALTER E. TRAUFFER

THE April 1 and April 15, 1925, issues of PIT AND QUARRY provided readers with a well balanced assortment of information. There were a number of good plant operating articles. Crushed stone operations described included the Stringtown Crushed Stone Company, McAlester, Okla., which operated a 1,600 ton per day plant at Stringtown, Okla. Lighting provisions for night operation were featured. W. F. Wise (now head of the Southwest Stone Company of Dallas, Tex.) was president of this company. The Tulsa Stone Company operated a 500 ton per day plant near Tulsa, Okla. The Santa Fe Railroad (A.T. & S.F.) built a 100 cu. yd. per hr. crushed stone plant at Brownwood, Tex., to supply ballast for its lines.

Perhaps the most interesting crushed stone operation described was that of the Basalt Rock Company near Napa, Calif. This 250 ton per hr. plant was the foundation from which the present huge organization, with its many diversified interests, has grown under the leadership of its president, A. G. Streblow. Features included coyote hole blasts bringing down 100,000 tons, a 3,000-ft. aerial tramway from the primary crusher in the quarry to the plant, stockpiles with tunnel conveyor reclamation, and a second automatic aerial tramway 6,000 ft. long to railroad cars or barges for shipment.

An unusual hillside plant was operated by the Zenith Limestone Co. at Price, Okla., which had a capacity of 2,000 tons daily. Full advantage was taken of gravity in passing the stone from the quarry at the top of the hill through the various crushing and screening stages.

There was a complete description of one of the most interesting lime plants then in existence, that of the Vermont Marble Company at West Rutland, Vt. This plant was built to use waste marble from the firm's dimension stone operations and featured two 8- by 125-ft. rotary kilns.

The sand and gravel plants described covered a wide area. California was represented by the Santa Paula Rock Company at Willard Bridge, which secured its material from a river bed. Concrete block and brick were also made at this location. The Munger Rock Company's new plant near Phoenix, Ariz., also processed river bed material. The East was represented by the Floral Park Sand Company at Elmont, Long Island, N. Y. This small operation represented a growing trend, in that truck shipments only were made.

In the news was the purchase of the Kaw River Sand Company by the Stewart Sand Company, headed by John Prince. The Greenville Gravel Company had started building a new plant in south Columbus, Ohio. J. K. Davison & Bros. had purchased the Valley Sand & Supply Company at Parnassus, Pa. The Lehigh Portland Cement Company had taken over the plant of the Bath Portland Cement Company near Bath, Pa.

Formation of the Pacific Sand and Gravel Association, a branch of the National Sand and Gravel Association, was announced. Headquarters were in Los Angeles. Quarry operators in the St. Louis, Mo., area had formed a temporary organization known as the St. Louis Quarrymen's Association. The National Slag Association had held its eighth annual convention at Cleveland, Ohio, on April 3, 1925. Officers elected were C. L. McKenzie, president; C. E. Ireland, vice-president; and H. J. Love, secretary-treasurer.

Special articles in these two issues covered such subjects as the following: night quarry operation; the relation of overhead costs to the determination of prices; credit and improvement; and fundamentals of fuel economy.

The Power Crane and Shovel Association announces a new handbook for the operator of power cranes, shovels, and draglines. Many hints on good shovel and crane operation are put forth in an amusing and clear manner. The manual is available free of charge to students in engineering schools and colleges and members of the International Union of Operating Engineers and their locals. This handbook may be obtained by others for 15 cents from the Power Crane and Shovel Association, 74 Trinity Place, New York 6, N.Y.

J. R. Simplot Co. Purchases Nunn Co.—Nevada Silica Firm

Purchase of a silica company in Nevada by the J. R. Simplot Company, Pocatello, Idaho, has been announced by George A. McHugh, Simplot manager of mines.

Mr. McHugh said the firm purchased is the Nunn Company of Overton, Nev., and that it will be operated by Simplot Silica Products, Inc., a newly-formed Nevada corporation. The company has a capacity of 10,000 tons per month.

Kaiser Buys 353 Acres Of Calif. Dolomite Land

Kaiser Aluminum & Chemical Corporation officials have announced the purchase of 353 acres of dolomite deposits adjoining the firm's Chemicals Division quarry and plant site at Natividad, Calif.

The purchase extends the corporation's property holdings in Monterey and San Benito counties to approximately 750 acres, including both the operational areas and the dolomite reserves.

Dolomite is quarried and processed at the Natividad plant. While some of the material is used for roofing rock and agricultural limes, calcined dolomite is shipped to the corporation's seawater plant at Moss Landing, 15 miles away, for processing into magnesia. Heavy-media separation is employed to up-grade the raw material, and burning is done in four rotary kilns at the Natividad plant.

The magnesia, in turn, is further processed at the Moss Landing refractory plant into high-temperature refractory brick and grains to make steel, cement, glass, and copper.

International Minerals Buys Two Perlite Producing Firms

According to an announcement issued by Louis Ware, president of the International Minerals & Chemical Corporation, this firm has purchased all of the assets of United States Mining Corporation and the Peerless Perlite Company. Both companies are located in Los Angeles, California, and their assets include large reserves of high-quality perlite ore in Inyo County, Calif., a drying and grinding plant near Big Pine, Calif., and a perlite expanding plant in Los Angeles.

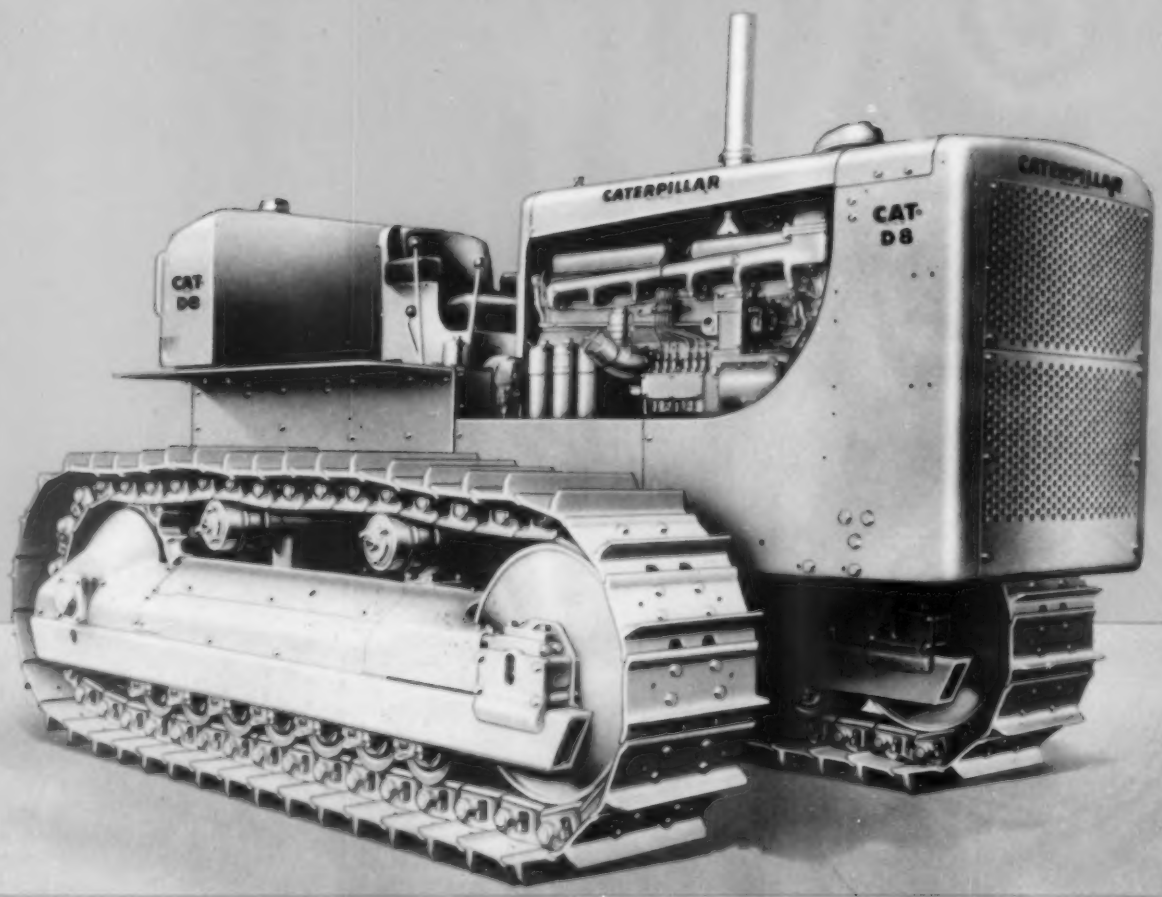
The properties will be operated by the Industrial Minerals Division of International Minerals & Chemical Corporation.

NEW

CATERPILLAR ANNOUNCES THE

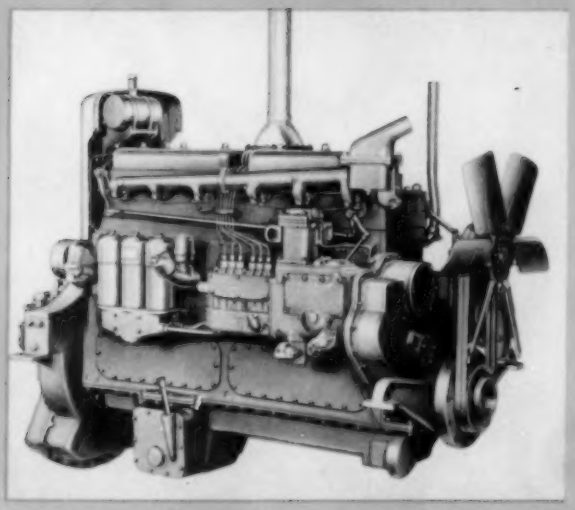
NEW D8

SERIES D and SERIES E

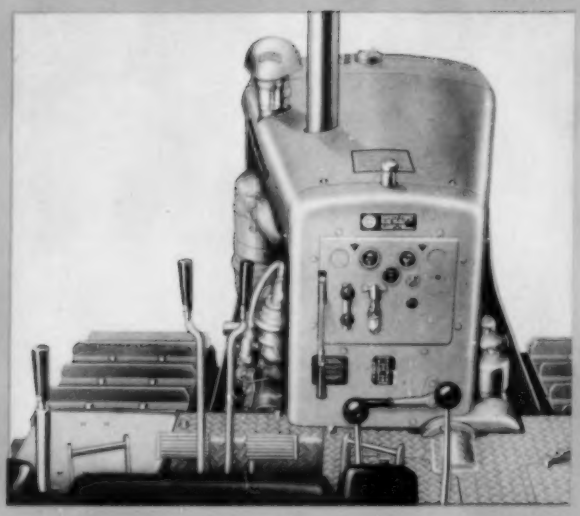


Choice of TORQUE CONVERTER or DIRECT DRIVE

You're looking at a major advance in tractor design—the new Caterpillar D8 Tractor. While it still bears the name of the unit that earned world-wide recognition as "boss of the crawlers," it is basically a *new* machine with 155 HP at the drawbar and your choice of torque converter (Series D) or direct drive (Series E). From its new 7-roller track frame to its new 191-HP, 1200-r.p.m. engine, it is built to deliver an even higher standard of money-making production on *any* track-type tractor application in *any* field. Along with its advance-design features, it retains such outstanding Caterpillar exclusives as the oil clutch and certain other job-proved developments. As a result, you can figure on it for *more* work at *lower* cost with *less* down time on *any* job. For complete information about the new, heavy-duty D8 Series D and Series E, see your nearby Caterpillar Dealer.

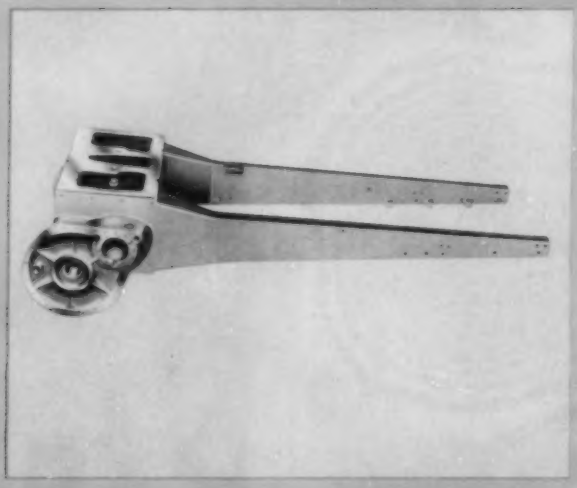


NEW ***ENGINE***, with new fuel injection system incorporating capsule-type injection valves. Flanged center main bearing to take crankshaft thrust. "Hi-Electro" hardened timing gear integral with crankshaft.



NEW ***EASY-WORKING CONTROLS*** handy to comfortable, one-man seat. The new streamlined hood affords greater visibility. The new easy-to-see instrument panel is attached direct to engine.

NEW ***"LIVE SHAFT" DRIVE***, independent of flywheel clutch. This important new feature provides constant power for rear-mounted cable controls or other equipment.



NEW ***WELDED ONE-PIECE STEERING CLUTCH CASE***—main frame assembly for a stronger "backbone." Transmission and steering clutches can be removed without disturbing other parts.

NEW ***OPTIONAL DRIVE***, torque converter or direct drive, whichever is best for your job. *Torque converter:* torque multiplication of 5 to 1 gives smooth operation in each speed range. 3 forward and 3 reverse: low 0 to 3.6 m.p.h.; intermediate 0 to 5.3 m.p.h.; high 0 to 7.4 m.p.h. *Direct drive:* 5 speeds forward and 3 reverse.

NEW ***7-ROLLER TRACK FRAME*** for greater stability, flotation and better ride.

NEW ***"WATER-QUENCHED" TRACK SHOES*** for longer life than ever before.

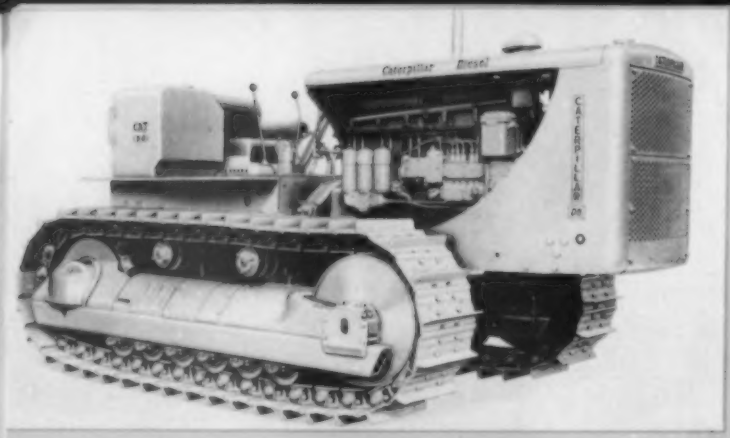
NEW ***HYDRAULIC BOOSTER STEERING***, pump drive direct from engine, independent of flywheel clutch, for maximum steering ease.

NEW ***STARTING ENGINE*** with more power for faster, surer starts in any weather.

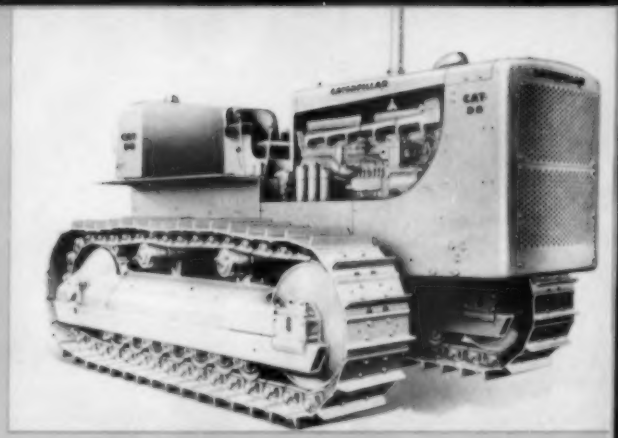
NEW ***"IN-SEAT" STARTING*** for greater convenience.

NEW ***118-GALLON FUEL TANK***, enough for normal 12-hour operation.

NEW ***ATTACHMENTS*** include cable controls—the new rear-mounted double drum No. 29 with constant power drive direct from engine, and the new front single drum No. 30. New, larger No. 8A and No. 8S Bulldozers, both cable and hydraulic controlled, are also available. The new No. 8U "U"-blade 'dozer has extra strength. Cable-controlled 'dozers use a 6-part line for greater lifting power. All equipment used on the D8 can be used on the new D8 Series D and Series E.



The D8



The NEW D8 Series D and Series E

CHECK THE DIFFERENCE ADVANCE DESIGN MAKES BETWEEN THE D8 AND THE NEW D8 Series D and Series E

	D8	D8 Series D with torque converter	D8 Series E with direct drive
Operating Weight	38,155 lb.	41,265 lb.	40,430 lb.
Ground Clearance	10½ in.	13 in.	13 in.
No. Track Rollers	6	7	7
No. Track Shoes	39	42	42
Length of Track on Ground	99¾ in.	111¾ in.	111¾ in.
Area Ground Contact 22-in. Shoe	4389 sq. in.	4917 sq. in.	4917 sq. in.
Fuel Tank Capacity	98 gal.	118 gal.	118 gal.
Drawbar	Swinging	Fixed	Fixed
Drawbar Pin Size	1¾ in. dia.	2¼ in. dia.	2¼ in. dia.
Steering Clutch	Over center spring booster	Hydraulic booster	Hydraulic booster
Steering Clutch Case	Cast iron. Integral with transmission case.	Steel fabricated. Separate from transmission case.	Steel fabricated. Separate from transmission case.
Transmission Case	Cast iron. Integral with steering clutch case.	Cast iron barrel. Separate from steering clutch case.	Cast iron barrel. Separate from steering clutch case.
Main Frame	Box section bolted to cast case.	Box section welded to steel case.	Box section welded to steel case.

Production-wise and profit-wise, you have a new yardstick of performance in the CAT* D8 Series D and Series E. Your Caterpillar Dealer, source of prompt service, will be glad to show you how this rugged new yellow machine can pay off for you!

Caterpillar Tractor Co., Peoria, Illinois, U.S.A.

MAIL TODAY!

CATERPILLAR TRACTOR CO., Peoria, Illinois, U. S. A.

Please send me additional information on the D8 Series D and Series E.

Name_____

Company_____

Street_____

City_____ Zone_____ State_____

CATERPILLAR*

*Both Cat and Caterpillar are registered trademarks—®

The new D8 Tractor —another example of CATERPILLAR LEADERSHIP in action

PRINTED IN U. S. A.

They Sold the Rock— Now They're Selling the Hole

● Truck-loading platform and rail entrance of the new, $4,000,000, 7-acre underground cold storage warehouse of the Inland Cold Storage Company near Kansas City, Kans. The cavern was created from the 100-acre mined-out area of the 450-acre limestone deposit owned by Thompson-Strauss Quarries, Inc., Kansas City, Kans. Note the horizontal strata of limestone and heavy overburden.

Inland Cold Storage Company, Inc., the wholly-owned subsidiary of the Thompson-Strauss Quarries, Inc., Kansas City, Kans., is a project born of constructive reasoning. The parent company has been mining limestone rock from a 450-acre quarry property for more than 20 years at the rate of more than 1,000,000 tons per year.*

Over these years, this operation has created a cave with more than 100 acres of floor space, topped with reported average overburden of 175 ft. While mining continued to add about 14 acres yearly to this area, it appeared to Leonard H. Strauss, president of Thompson-Strauss, that the mined-out area might be put to excellent use for storing produce requiring the constant temperature of this space, which averages 55 deg. F.

The mine is located eight miles west of Kansas City, Mo., and only 4 miles from West Kansas City, Kans., on the main line of the Santa Fe railroad. There are four entrances at track and highway level. The roof stratum of limestone over the entire area offers a permanent, solid rock structure having 40-ft. clear spans between columns, that could not be equalled if constructed by man. No underground water stands in the mine.

Consideration of these favorable facts led company heads to have a survey made to determine the extent and nature of the demand for mid-continent refrigerated storage space. It was found that a serious shortage of such facilities existed for the rapidly-growing frozen food industry and for products requiring cool and dry storage space. The impregnable character of the area offered a ready-made haven in the event of an atomic attack.

There were some serious engineering problems to be solved to convert the space into a usable structure. To stabilize the lower stratum of limestone against any shrinkage movement induced by the extremely low refrigerating temperatures required, 14-ft.-long bolts had to be driven into the solid limestone roof at 4-ft. spacings. Large iron washers at the bottom of these supporting bolts effectively tie the roof in place.

Over 5,000 cu. yd. of heavy-duty concrete had to be placed over the 350,000-sq. ft. of floor in the first unit area, which then provided over 5,000,000 cu. ft. of storage space. All the best features of modern refrigerated warehouses, including humidity control, low-temperature fluorescent lighting, complete palletization, and flood protection and refrigeration equipment, had to be installed. The entire area was strung with a fire-quenching pipe system.

The capacity of the new plant for retaining cold became one of its biggest advantages. When the 400-t.p.h. Frick ammonia-brine refrigeration system was turned off, to convert an area to dry storage, the temperature inside rose only three deg. F. in 60 days. In contrast, a temperature rise of about five deg. F. every 24 hours is the normal expectation following equipment failure in the average above-grade warehouse. To prevent passage of heat through the partition and perimeter walls of concrete, these areas were insulated with 6 in. of Pittsburgh-Corning fibre-glass.

A railroad spur line running directly into the plant, can handle 18 freight cars at one time. Unloading is done in temperatures ranging from 40 to 55 deg. F. No elevators or ramps are required and cars can be

(Continued on page 148.)

● A portion of the underground cold storage area, showing a fork-lift truck with a palletized unit load and the refrigeration equipment. View also shows the tie bolts driven into the limestone deposit to stabilize the roof against temperature changes. The concrete floor, placed by ready-mix trucks, covers the 350,000 sq. ft. now in operation in this spacious "ice-box".

*Additional information and illustrations have become available since the publication of our earlier article on this "freezer" in the January, 1955, issue, page 40.

FAST PRODUCTION TEAM for off-road hauling . . .

You get high-speed production on both excavating and hauling when you team Koehring fast-shuttling Dumptors with Koehring heavy-duty shovels. Notice on the loading operation, above, how Dumptor spots in close — keeps shovel swing short. Square body opening provides a big, easy-loading target — can be loaded over either end, or from the sides.

On the haul, Dumptor travels round trip without turning, has the same fast speeds in either direction. This eliminates at least 2 slow turns every round trip — often saves as much as 30 seconds on every cycle. What's more, 1-second gravity-dump saves more time on every trip — and, gravity-dump never balks, never wears out. This Koehring 6-yard heavy-duty hauler also has better than 6 h.p. for every ton of loaded weight. It accelerates fast, pulls through soft ground and up steep grades with less shifting, climbs 24% ramps or grades fully loaded.

Now, take a quick look at the other half of this heavy-duty team — the Koehring ¾-yard 304 shovel. Its powerful digging crowd is backed by plenty of weight-stability to hold solidly to the grade. Automatic take-up and release of tension on crowd chain assure maximum dig-in power at every boom angle. Powerful 304 booster clutch requires only ⅓ to ½ the lever pull of a straight manual clutch, yet retains accurate "feel" of load. Instant dipper-trip that works *every time* is another Koehring feature that steps up shovel cycles, and increases daily yardage output.

This Koehring 304 is readily convertible from shovel to ¾-yard hoe, big-capacity clamshell, dragline, or lift crane. As a crawler-mounted crane, it has 13.9 ton lift capacity — and 25-ton lift capacity on rubber-tired truck or cruiser mounting. 4 other models in the Koehring heavy-duty line offer you a complete range of sizes.

. heavy-duty digging

Consider what this combination of Koehring excavators and Koehring Dumptors can mean to you in overall operating efficiency, economy — and in time-saving convenience when you standardize on *one make* of equipment for all of your excavating and hauling. Get more complete information on Dumptors®, and on the 5 sizes of Koehring excavators from your Koehring distributor. Call him today for all the facts — or write us for catalogs.

CK540

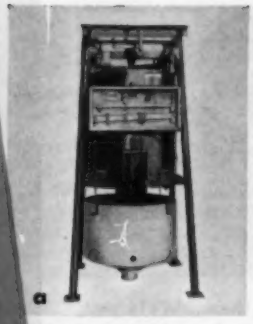
KOEHRING COMPANY

Milwaukee 16, Wisconsin

Subsidiaries: JOHNSON • PARSONS • KWIK-MIX

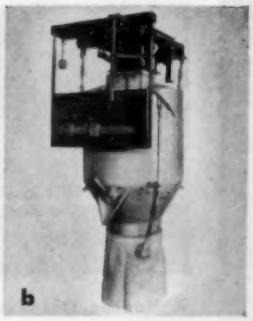
ideas

for low-cost handling of aggregates and cement



a

Water Batchers
give close quality control of concrete. Semi- or full-automatic. 120 and 240-gal. capacities.

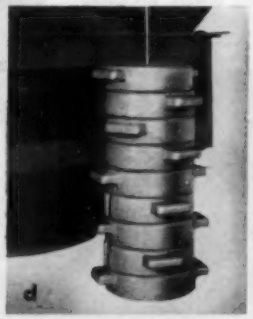


b

Cement Batchers
6 sizes from 10 to 38 cu. ft. Scale capacities from 700 to 3000 lbs. Semi- or full-automatic controls.

c

Single-Material Batcher
properly sized for 1¼ cu. yd. batch. 2560-lb. beam capacity for stone — 1520-lb. beam capacity for sand.



d

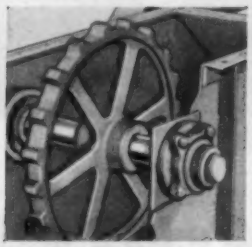
Batcher Test Weights
available in sets of nine 50-lb. calibrated units, and two 25-lb. steel hangers. Assure accurate weigh-batching.

e

Yard Bin
is ideal for loading trucks where no batcher is required. 9-ft. clearance under discharge gate. Holds 35 cu. yds.

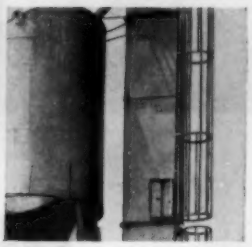
f

Elevator Buckets, Chains
2 types, 7 sizes of buckets for aggregates and cement. Johnson long-life steel chain has carburized knuckles.



g

Chain Sprockets
19-tooth, chilled-rim cast iron with heavy split hub, double-rim lugs. Also, 12-tooth cast-chrome manganese.



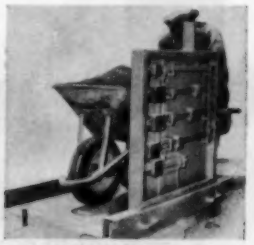
Elevator Safety Cage
Johnson ladder safety cage, welded to elevator casing, is 28 inches in diameter. Costs only a few dollars per foot.

i

Clamshell Buckets
all-welded, smooth inside and out. Fast-filling, easy closing. Manganese cutting edge. 3 types, 10 sizes, ⅜ to 3 yds.

k

Concrete Buckets
3 types: Finger-Tip Control in ½ to 2 cu. yd. sizes; 1 to 4 cu. yd. Johnson-Dravo; and 2 to 8-yd. Lo-Slump buckets.



l

Little Titan Scale
accurately weighs loaded barrows. Has one, two or three 500-lb. weigh-beams. Light — 2 men can carry.

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25 PO

At Kenton, Ohio—in the world's largest, most modern trailer axle plant—a hydraulic press (right) exerts a 50-ton pressure near the end of every TDA Trailer Axle, bends the tube next to the seams to *insure* strong welds, no weak spots, and complete absence of flaws.

WE BEND TRAILER AXLES

...to insure that all welded super-strong!

Another example of TDA hidden quality—typical of the ends to which we go for greater highway safety—proof in advance that TDA Trailer Axles can take it!

Double trouble! Yes, TDA Trailer Axles are torture-tested at *both* the Kenton, Ohio plant—and the famous Timken-Detroit indoor proving ground in Detroit!

The Detroit "Torture Chamber" is a multi-thousand-acre proving ground condensed into one room. Here, our engineers can subject stock axles and gearing *indoors* to any outdoor operating condition. Put over 50 years' experience gained in building axles for trucks, buses, trailers, farm machinery to work for you.

Result? Far greater highway safety, longer axle life, reduced maintenance, repairs and downtime; lowered operating costs. *No wonder Timken-Detroit Axles are the choice of leading manufacturers and operators.*

For your own protection and safety specify Genuine TDA Equipment Parts!

Take no chances with substitute replacement parts. For longer axle life—for greater operating safety—insist upon genuine Timken-Detroit axle and brake parts, identical to your axles' original equipment.

For a dependable factory-type job, to cut labor and adjustment costs . . . *order* your replacement parts by TDA number from your trailer manufacturer.

TDA...the *Lightest* trailer axle on the market...and the strongest!

Proved far stronger, more rugged and safer in all-out "Torture Chamber" tests, TDA Trailer Axles are also many pounds lighter than any competing axles on the market today. Weight saving is possible through the use of TDA lightweight, pressed steel brake shoes, up to 50% lighter, and stronger, too.

Other hidden quality features that increase TDA life and performance are forged alloy steel spindles, cam roller mountings in Nylon bushings, machined cam head, cleaner cut splines and self-aligning camshaft support brackets. Good reasons leading manufacturers and operators specify TDA.

Heat and stress relief treatment for greater strength!

Note the greater extent and depth of heat treatment given this TDA Cam and Seamless Tube. Tube is heat-treated for the *full length*. And, the camshaft is *completely* heat-treated; not just the head. An important ingredient of TDA superiority.

A stress relief treatment is given *every* tube to relieve any stresses created during machining and welding.

TDA Spindles forged of alloy steel have higher rockwell hardness than any other axle spindle on the market.

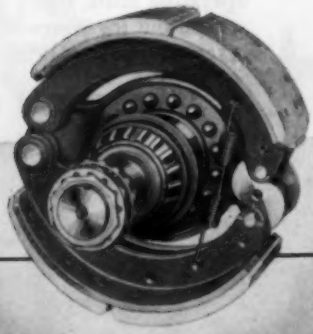
WITH 50-TON PRESSURE seams are

TIMKEN Detroit AXLES

TIMKEN-DETROIT AXLE DIVISION
ROCKWELL SPRING AND AXLE COMPANY
DETROIT 32, MICHIGAN

The Accepted D A Standard
TRADE MARK REGISTERED

MEMBER TRUCK-TRAILER MANUFACTURERS ASSN. TTMA



ONLY TDA BRAKES give all these tested advantages!

- Brake shoes made of steel save up to 40 pounds per axle . . . give strong braking action with no distortion.
- Patented liner shape—thickest where wear is greatest.
- Liners riveted on—no chance of movement on shoe.
- Liners circle-ground to cover all efficient braking area of shoe.
- Rustproofed anchor pins locked in. Ends of pin sealed against foreign matter.
- First with self-aligning camshaft housings.
- Cam rollers heat-treated to roll smoother, wear longer.
- First with all-Nylon camshaft bushings.
- Compare similar products part for part and prove to yourself that TDA brakes incorporate the finest quality materials, skilled workmanship and advanced design.

HUSKY WHITE DUMP TRUCKS in the Varney fleet are like this Model WC2864-OH with 10-yard body with heavy-duty hoist, husky front axle, 11.00 x 24 12-ply tires, 176-inch wheelbase, 506B transmission and SFDD4600 tandem rear axle with 9.02 ratio, inter axle differential.

Schedules UP... Operating Costs DOWN with WHITE SIX WHEELERS

VARNEY BROS., Inc.
Bellingham, Mass.
boosts loads with WHITES

WHETHER it's sand and gravel or ready-mix, Varney Bros. Sand & Gravel Co. have stepped up schedules with White Six-Wheelers. Operating costs are down, too!

It's the same story across the country. The big loads, the tough trips, the tight schedules go by White . . . and leaders everywhere report that Whites cut operating costs, boost profits.

Find out for yourself! Get facts from your White Representative . . . today!

THE WHITE MOTOR COMPANY
Cleveland 1, Ohio

MINIMUM MAINTENANCE—
White Mustang Engines have plenty of power for outstanding performance, Donald A. Varney, president, reports.

"Whites assure us economical operation of our truck fleet," he says.

BIGGER LOADS—
Treasurer Clarence E. Varney says this fleet of 19 Whites cuts costs . . . boosts deliveries. Bigger payloads important for more savings.

TWO MORE WHITES
—Two more White Six-Wheelers have just been added to the Varney fleet to keep up with demands for concrete for construction according to Richard Varney, vice-president.

FLEET OF WHITES keeps rolling! Here is part of the Varney ready-mix fleet which operates in the heart of Massachusetts. Varney has boosted body capacities substantially and the Whites are rugged and ready to go with these bigger payloads.

White

FOR MORE THAN 50 YEARS THE GREATEST NAME IN TRUCKS

"Mattresses" for the Mississippi

The Weymouth Construction Company of Memphis, Tennessee has the important job of casting concrete mattresses at the Helena, Arkansas casting field. Each year approximately 132,000 of these "mattresses," which require 110,000 cubic yards of concrete, are poured at the casting field. The mattresses are then picked up throughout the year and placed along the banks of the Mississippi River to help keep the mighty Mississippi flowing along its accustomed course.

Gulf lubricants and fuels are used exclusively by the Weymouth Company to keep equipment on this important operation performing smoothly and continuously. They have found that Gulf lubricants cut maintenance costs, and that Gulf fuels burn evenly and completely to insure top engine performance.

And they also appreciate Gulf's excellent engineering service, which helps insure the use of the right lubricant and fuels for each unit and climatic condition.

Contact your nearest Gulf office today and let us discuss with you how Gulf products and fine service can benefit your operation.

GULF OIL CORPORATION • GULF REFINING COMPANY
1822 Gulf Building, Pittsburgh 30, Pa.

Gulf Quality Lubricants and Fuels

... the finest for all your needs

cement mill liners in ABK METAL last longer

You can cut replacement cost of liners in primary, secondary or tertiary compartments—for wet or dry grinding of raw stone or finished product—with ABK Metal abrasion resistant liners.

Here are typical reports from operators who have experienced real savings. "ABK Metal outlasted chilled white iron 2.9 to 1". . ."ground an additional 1.5 million barrels before replacement" . . . "ABK liners tripled our interval between relinings" . . . "less downtime for replacements and lower labor maintenance costs".

Moreover, ABK liners maintain desired contours, providing maximum agitation and grinding motion in the mill.

Let us show *you* how ABK Metal—a nickel-chrome alloy of controlled structure with an extreme hardness (500-700 Brinell, as required)—can lower costs and improve performance in your mills.

for better protection against abrasion specify ABK METAL

AMERICAN Brake Shoe COMPANY

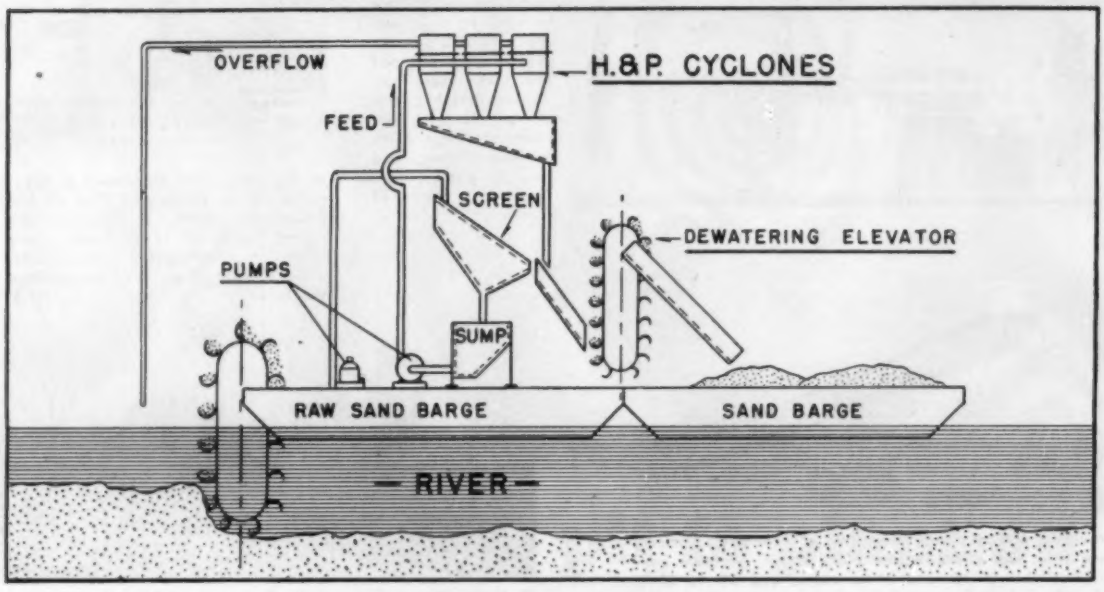
Baltimore • Chicago • Houston • St. Louis • San Francisco • Superior • Toledo

BRAKE SHOE AND CASTINGS DIVISION

230 Park Avenue, New York 17, N. Y.

Heyl & Patterson Cyclones

HELP RECOVER HIGH GRADE MARKETABLE SAND



Here is another example of the versatility of Heyl & Patterson Cyclones.

A large sand and gravel company has devised a system which is recovering a substantial amount of high grade, marketable sand. It is noteworthy that all classifying and thickening in this operation are accomplished by Heyl & Patterson Cyclones.

The slurry is fed from a sump at 1500 gallons per minute to 3 standard 14" H & P Cyclones. The slurry is composed of small particles of river sand having a solids concentration of less than 4% by weight.

The waste slurry from the washing operation of the coarse sand is processed by a manifold of 14" Cyclones which recovers a substantial tonnage of +200 mesh grains and rejects the undesirable deleterious earth.

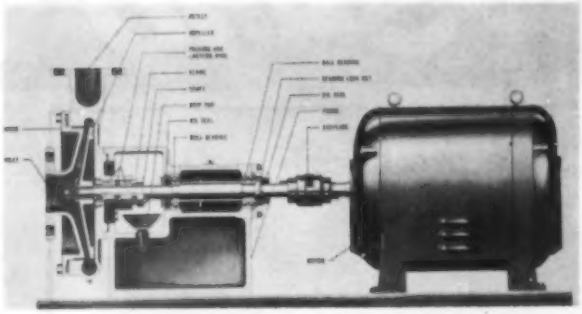
The underflow from the Cyclones averaging 75% solids by weight is delivered to the sand barge. The overflow containing the deleterious earth is thrown overboard. Write for Free Cyclone Booklet CT-954.

Heyl & Patterson, Inc.
"SINCE 1887"
55 FORT PITT BLVD · PITTSBURGH 22, PA.

Heavy Bulk Materials Handling Equipment
All The Way from Design to Erection

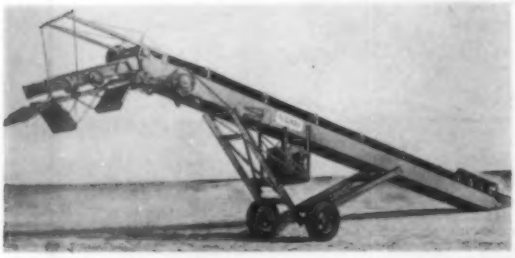
New Machinery and Equipment

(For more information, use card on p. 135)



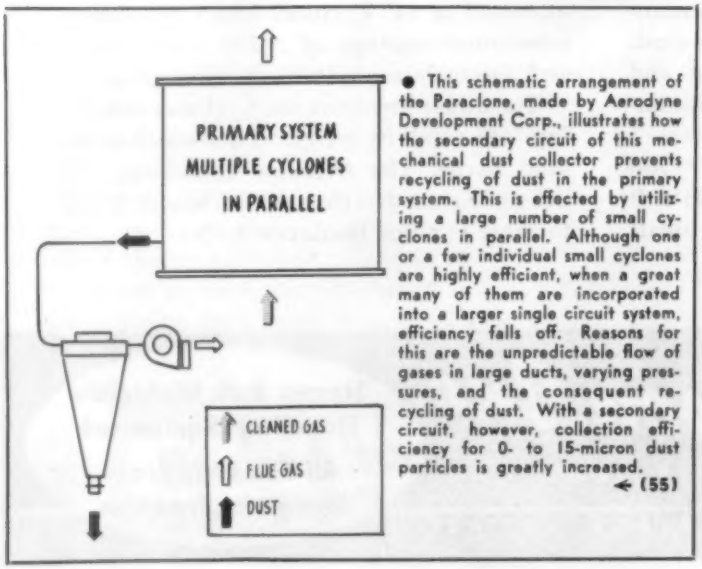
● Dorr-Oliver Inc., announces the addition of 3 sizes to their Type L Centrifugal pump line—which now includes 1-, 1¼-, and 1½-in. models plus the previously released 2-in. unit. These corrosion-resistant pumps incorporate new elements of design which increase efficiency and simplify priming. ← (51)

● Joy Mfg. Co. announces a new larger model in its Champion line of blasthole drills — the 60-BH. A rotary-air drill designed for 9- to 12-in. holes in any rock formation, it cuts with a roller-cone type bit while a blast of air removes cuttings from the hole. ↑ (52)

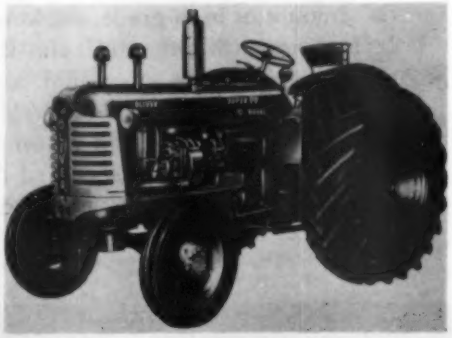


● Providing strength and versatility at economical prices, Kolman Mfg. Co. offers its new 202 "Junior" portable conveyor. Available in 18- and 24-in. widths and 30- to 50-ft. lengths, the "Junior" is available in longer lengths in the stationary models. Its new box-type construction is the answer to demands for a low cost portable conveyor stout enough to carry a loading trap and large vibrating screen without extra supports. ↑ (53)

● Huber-Warco Co. says its first new product, the 5D-190, is the first motor grader to offer a power of 195 hp. Powered by a General Motors 6-71 diesel engine, clutch elimination has been achieved, thus reducing shock loading. The tail shaft governor automatically adjusts the engine rpm to meet any load conditions at any ground speed set by the operator. Weighing about 32,000 lb. and using 16.00 x 24 tires, it provides equal flotation and greater ground friction to resist side thrust of blade operation. All wheels are interchangeable. ↑ (54)



● This schematic arrangement of the Paraclone, made by Aerodyne Development Corp., illustrates how the secondary circuit of this mechanical dust collector prevents recycling of dust in the primary system. This is effected by utilizing a large number of small cyclones in parallel. Although one or a few individual small cyclones are highly efficient, when a great many of them are incorporated into a larger single circuit system, efficiency falls off. Reasons for this are the unpredictable flow of gases in large ducts, varying pressures, and the consequent recycling of dust. With a secondary circuit, however, collection efficiency for 0- to 15-micron dust particles is greatly increased. ← (55)



● The Oliver Corporation's new Super 99 GM diesel boasts 72 hp. on the drawbar and 80 hp. on the belt. Powered by the popular General Motors 2-cycle completely diesel engine that starts quickly on diesel fuel alone, it incorporates a 6 forward-speed transmission. Other features include a flat operator's platform with an abundance of room, rubber spring seat, double-disc differential brakes, and a recirculating ball-type steering gear that makes this big tractor easy to handle. ↑ (56)

B.F.Goodrich

Tires roll from pit to plant on rock-strewn roads, defy cuts!

THE roads that connect the mining pits with the Charleson Iron Mining Company's plant at Virginia, Minn., are covered with chunks of abrasive rock and stone. Trucks roll over these roads 24 hours a day, 7 days a week, carrying 17-ton payloads.

Tire mortality could be high. This company uses B. F. Goodrich Universal tires, reports they defy rock cuts.

All-Nylon cord body

They wear longer, too, because Universal tires, size 12.00 and larger, are built with an all-nylon cord body. Nylon is stronger than ordinary cord materials, withstands double the impact, resists heat blowouts and flex breaks.

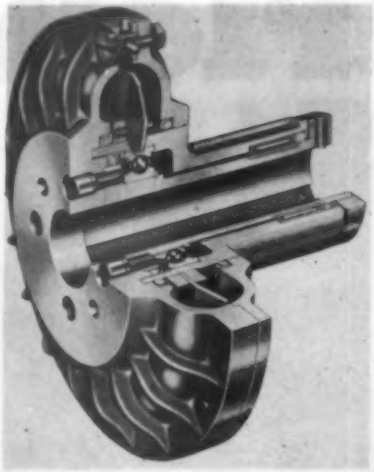
Under the tread is the B. F. Goodrich nylon shock shield. Layers of strong nylon cords stretch together to absorb and distribute impacts, protect the tire body from shocks and bruises. This means Universal tires wear longer, can be recapped more times. You pay nothing extra for this patented B. F. Goodrich nylon shock shield.

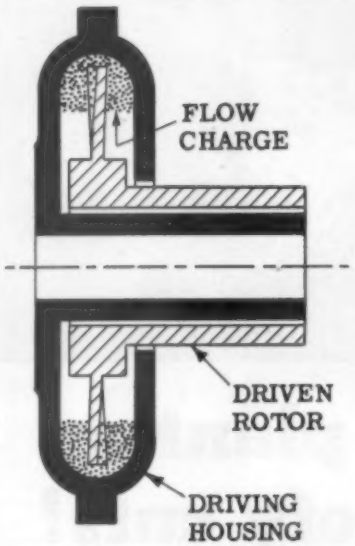
See all-nylon tires today at your B. F. Goodrich retailer's (smaller sizes in all-nylon or rayon construction). The address is listed under Tires in the Yellow Pages of your phone book. Or write *The B. F. Goodrich Company, Tire & Equipment Division, Akron 18, Ohio.*

TONS OF ROCK crash onto B. F. Goodrich Universal tires that will carry the load up steep hauling roads to the plant. BFG makes a complete line of off-the-road tires.

CHARLESON'S TIRES are 95% B. F. Goodrich, preferred because the specially-compounded tread defies rock cuts, gives outstanding traction compared to other rock-type tires.

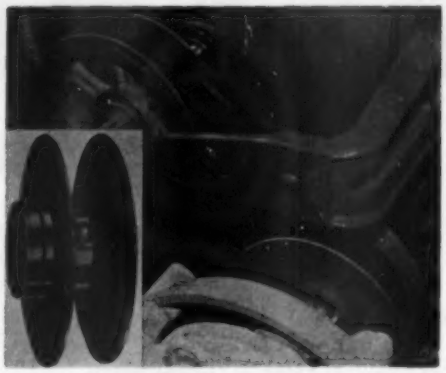
Specify B. F. Goodrich tires when ordering new equipment





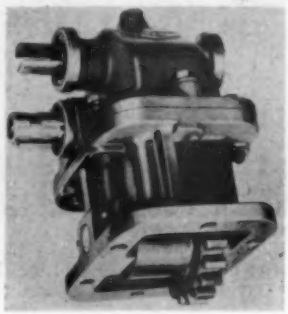
● A new development in industrial power transmission, called Flexidyne, and described as a dry fluid drive, has been announced by the Dodge Mfg. Corp. Based upon a new principle, Flexidyne easily handles difficult starting and reversing problems, and gives a new kind of protection against shock and overloads, according to Dodge. An important advantage claimed for the new drive is that at normal operating speeds slippage is not experienced. At the same time, in case of an overload, it is slippage which gives protection. Originated and already proven in Europe, the new drive has been redesigned by Dodge to American standards and will be available from stock through regular Dodge distributors. The Flexidyne drive is made up of a housing, inside of which a rotor is free to turn concentrically. Between the two are fine particles of spherical steel shot, called the "flow charge," which acts much like a fluid. It is the flow charge which transmits power from the housing to the rotor. This flow charge is easy to seal in, has a high density, and can stand relatively high temperatures. ← (57)

● A new batch-type bituminous mixing plant, the H-15, has been put on the market by the Iowa Mfg. Co. With a capacity range of 35 to 60 tph., this pugmill mixer has a capacity of 15 cu. ft. (net below center line of shafts). The plant is extremely easy to erect since the sections are self-contained units. Offered as either a portable or stationary unit with a choice of combustion engine or electric motor drive, optional equipment available includes portable equipment, mineral filler attachment, and an electric timing and locking device. ↑ (58)



● The American Pulley Co. announces a new single-groove, wide-range, adjustable-speed drive available in "Q", "R", and "W" belt sections. The drive, which will safely transmit up to 30 hp., permits a speed variation of as much as 100%. The manufacturer claims considerable savings in both space and money when compared with similar installations using multi-V-belt adjustable-speed drives. ↑ (59)

● A new high-strength wire rope, claimed to be 15% stronger than wire rope now being made by American Chain & Cable Co., Inc., has an average tensile strength of 300,000 psi made possible by the use of special high carbon steel. Known as VHS, the rope diameters range from 1/2- to 2-in. ↑ (60)



● Dana Corp. offers a new medium-duty 2-gear single speed Spicer power take-off which eliminates case interference with the output shaft. Model FA features normal shaft speed, while Model FB works at low shaft speed — particularly desirable where shaft speeds of other medium duty take-offs are excessive. → (61)

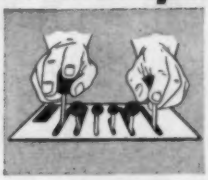
In every size, Link-Belt Speeder offers

more speed, stamina, power, work-time!

PATENTED SELF-CLEANING CRAWLER TRACK of LS-98 saves you money. Staggered shoe lugs and drive sprocket lugs force foreign material out, preventing excessive wear on drive mechanism—one of many bonuses.

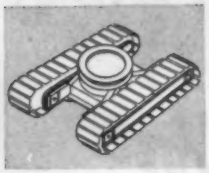
13,798

More speed—



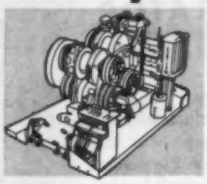
Speed-o-Matic, the true power-hydraulic control —smooth, positive response—perfect "feel" for speed with accuracy. Engineered to consider the human factor, greatly reduces operator fatigue.

More stamina—



A Link-Belt Speeder withstands continuous heavy-duty, high-speed operation. For proof, compare similar sized rigs with and without counterweights. Link-Belt Speeders have more "live weight", more strength built into every component.

More power—



Get more line pull, more digging power, lower fuel costs. Link-Belt Speeder design calls for precision-machining, anti-friction bearings and splined shafts at every point that helps transmit *rated hp* into *usable* hp.

More work-time—

A bigger percentage of shift is spent in actual "work-time." By minimizing operator fatigue, Speed-o-Matic boosts output up to 25%; also eliminates frequent on-the-job clutch adjustments and maintenance.

Visit your Link-Belt Speeder distributor and see these great machines first hand. A demonstration can be arranged at your convenience to prove that Link-Belt Speeder gives you most for your money.

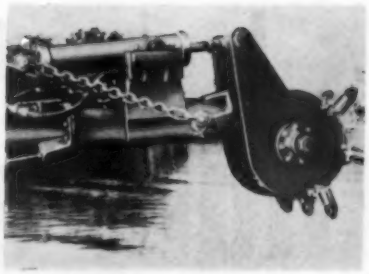
You're ahead on every job—

because Link-Belt Speeder is *years ahead* of the shovel-crane industry. Only Link-Belt Speeder offers you Speed-o-Matic's true power hydraulic control and so many other outstanding design and construction advantages. For facts on every machine in the ½ to 3-yard, 10 to 60-ton work range, contact your Link-Belt Speeder distributor. Link-Belt Speeder Corp., Cedar Rapids, Ia.

LINK-BELT SPEEDER

Builders of a complete line of crawler and rubber-tired shovel-cranes

● The Caterpillar Tractor Co. has announced a new 5-roller, oscillating-type track roller frame available as an attachment for the Cat D4 tractor. Installation of this track roller frame will provide increased traction, greater flotation and better stability, particularly when the unit is operating in hilly terrain and locations where soil conditions are soft or unstable. A tractor equipped with a 5-roller track frame requires a 34 section track in place of the 31 section track included on the standard 4-roller machine. ← (62)

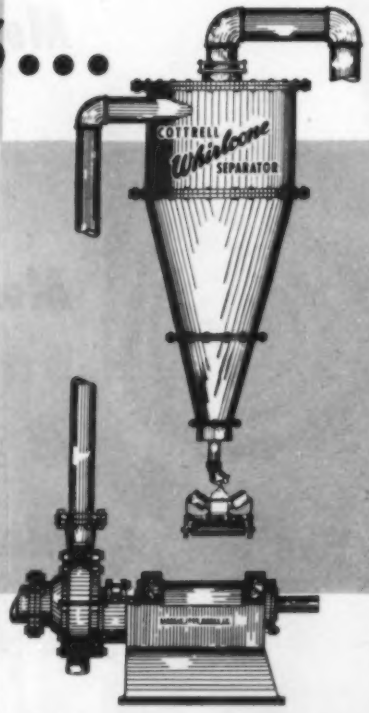


● The Agipeller, an ingenious new suction dredge agitator designed to increase dredging output, reduce down-time due to clogging of the nozzle, and lower overall dredging costs, is being offered by the W. H. Pfarrer Co. Automatic reversal occurs when tramp metal enters. ↑ (63)

Now You Can Recover Your Fines With This...

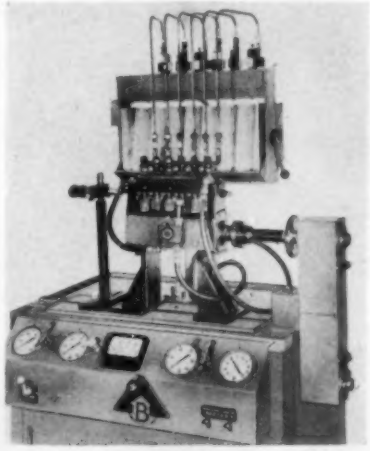
COTTRELL *Whirlcone* SEPARATOR
PAT. PENDING

Thousands of tons of valuable sand in the minus 50 mesh range are lost with wash water in Sand Plants all over the world. The well-known Cottrell Whirlcone Separator will save this sand at small cost.



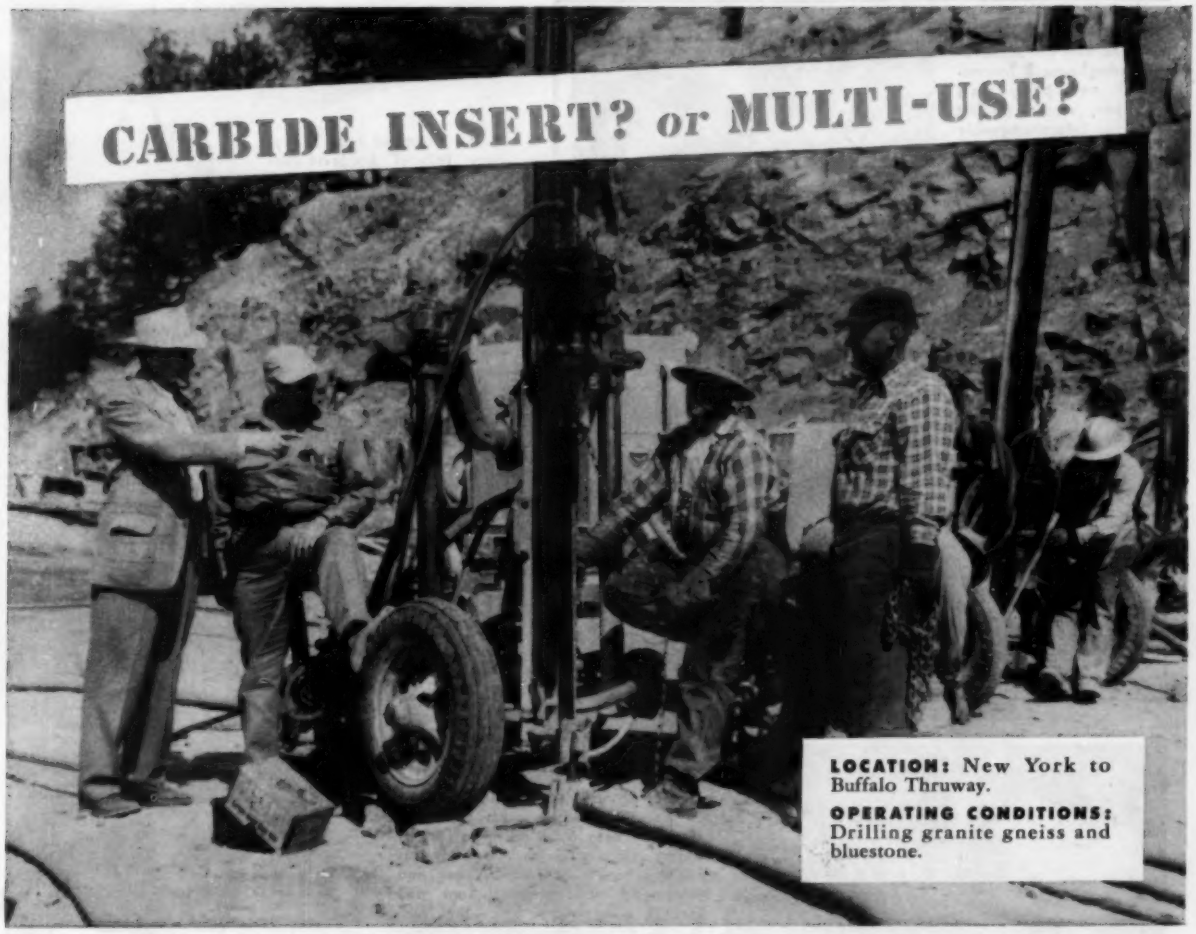
COTTRELL ENGINEERING CO.
DIVISION OF
GIW
GEORGIA IRON WORKS CO.
AUGUSTA, GEORGIA

The Whirlcone will de-slime and dewater these fines with approximately 95% efficiency in the plus 200 mesh range. There is a GIW Slurry Pump and a Cottrell Whirlcone Separator combination to fit any plant flow sheet. If you are losing fines, let us have your inquiry giving approximately the volume of flow and the nature of the losses. Our recommendations and literature will follow.



● Bacharach Industrial Instrument Co. offers a diesel pump calibrating stand which is economically priced to bring this type of measurement into the reach of small operations. Transmission of power from the drive shaft to the pump coupling is by a power arm changeable from left to right side of the stand, thus making it possible to position left or right hand pumps so that the inspection opening in the pump housing faces outward for easy access to internal parts. ↑ (64)

● Two new hydraulic powered front end loaders offering greater reach at maximum and intermediate heights have been added to the Sherman Products line of excavating, earthmoving, and material handling equipment. The frames of both models are designed to distribute stresses safely along the entire tractor frame, and extend the full tractor length. ↑ (65)


CARBIDE INSERT? or MULTI-USE?
LOCATION: New York to Buffalo Thruway.
OPERATING CONDITIONS: Drilling granite gneiss and bluestone.

L. G. Defelice & Son, Inc. cuts costs on New York superhighway by using TIMKEN® carbide insert bits to drill 32′ holes in granite gneiss

IN drilling operations on the New York to Buffalo Superhighway, L. G. Defelice & Son, Inc. of North Haven, Conn., cut costs by using Timken® carbide insert bits. Drilling extremely deep holes in granite gneiss and bluestone, they get increased drilling speed, need fewer bit changes.

Through hard and abrasive ground, Timken carbide insert bits are the most economical. They are also the best bit for constant-gauge holes, small diameter blast holes and very deep holes.

But they may *not* be the best answer for *all* your drilling problems!

For ordinary ground, Timken multi-use bits are most economical. With correct and controlled reconditioning, they'll give the lowest cost per foot of hole when full increments of steel can be drilled.

Both Timken carbide insert and multi-use bits are interchangeable in the same thread series. A wide range of different Timken bits fit the same drill steel! As the ground changes, you change bits quickly, easily—right on the job!

All Timken bits are made from electric furnace Timken fine alloy steel, have the shoulder union developed by the Timken Company that protects threads from drilling impact.

For the best bit type for your particular drilling requirements, call on the Timken Rock Bit Engineering Service. Write The Timken Roller Bearing Company, Rock Bit Division, Canton 6, Ohio. Cable address: "TIMROSCO".

Timken multi-use rock bit

Timken carbide insert rock bit

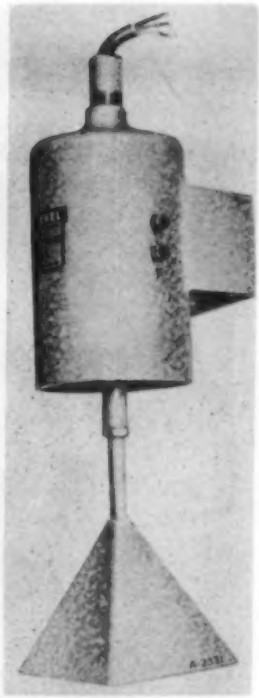
your best bet for the best bit ... for every job

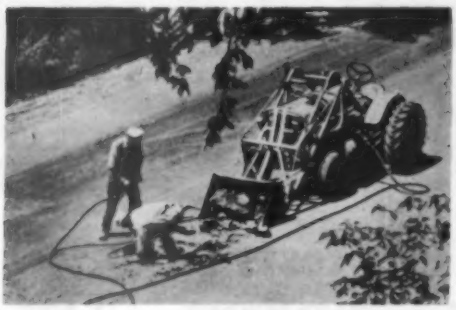
TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

● The new LeTourneau-Westinghouse B Tournapull self-propelled scraper, whose trailing unit is interchangeable with a rear dump unit, has a 23-yd. capacity and a single 293 hp. diesel engine (either Cummins or General Motors). Offering 10 gear ratios, the big machine is 40 ft. 6 in. long, 11 ft. 8 in. wide, and 12 ft. 7 in. long. It offers 10 gear ratios from 2.4 to 28.4 mph. → (66)

● An improved type heavy-duty "Tellevel" bin level control is now being marketed by Stephens-Adamson Mfg. Co. Major changes involve a redesign of switch housing and deflector mechanism to further reduce any possibility of sticky material building up on the unit. The pendant steel cone deflector has been replaced by a steel pyramid. Standard duty and explosion proof models are available for lighter service with small lump, granular, and powdered materials. The switch housing is now a one piece unit of spun steel tapped at one end for electrical conduit and sealed at the other end by a molded rubber grommet. → (67)

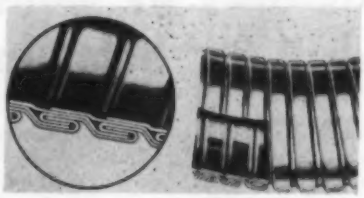


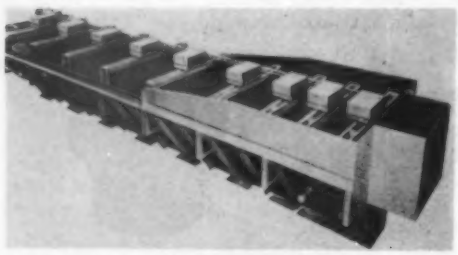


● This photo illustrates how the new Le Roi 125 Tractair saves time and money. These men had to repair widely separated sections of this country road. With a breaker and front end loader attachment, the Tractair did the job. Since the Tractair is a self-propelled compressor, expense was minimized by eliminating a truck for transportation and towing. ← (68)

● A new 15 cu. yd. dirt wagon is announced by The Webb Corp. with low center of gravity, and ball-type hitch which will allow the tractor or trailer to be in any position and not put any undue strain on the tractor or wagon. The doors are operated by cables and actuated by hydraulic cylinder which is operated from a valve located in the cab of the tractor. The operator is in complete and accurate control of the doors at all times. The doors may be opened to any position so material can be windrowed and may be closed at any time whether the wagon is moving or stationary. ↑ (70)

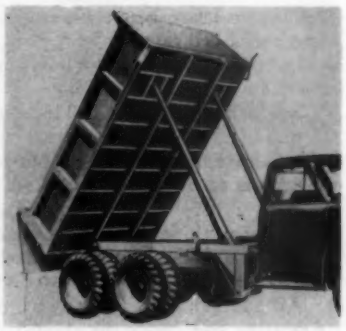
● A new flexible metal hose especially designed for use in conveying materials having abrasive and corrosive characteristics has been announced by Universal Metal Hose Co. Two types are available: Type U-100-L standard weight (.015 in. galvanized steel strip); and Type U-120-L heavy-duty (.020 in. galvanized strip). → (69)



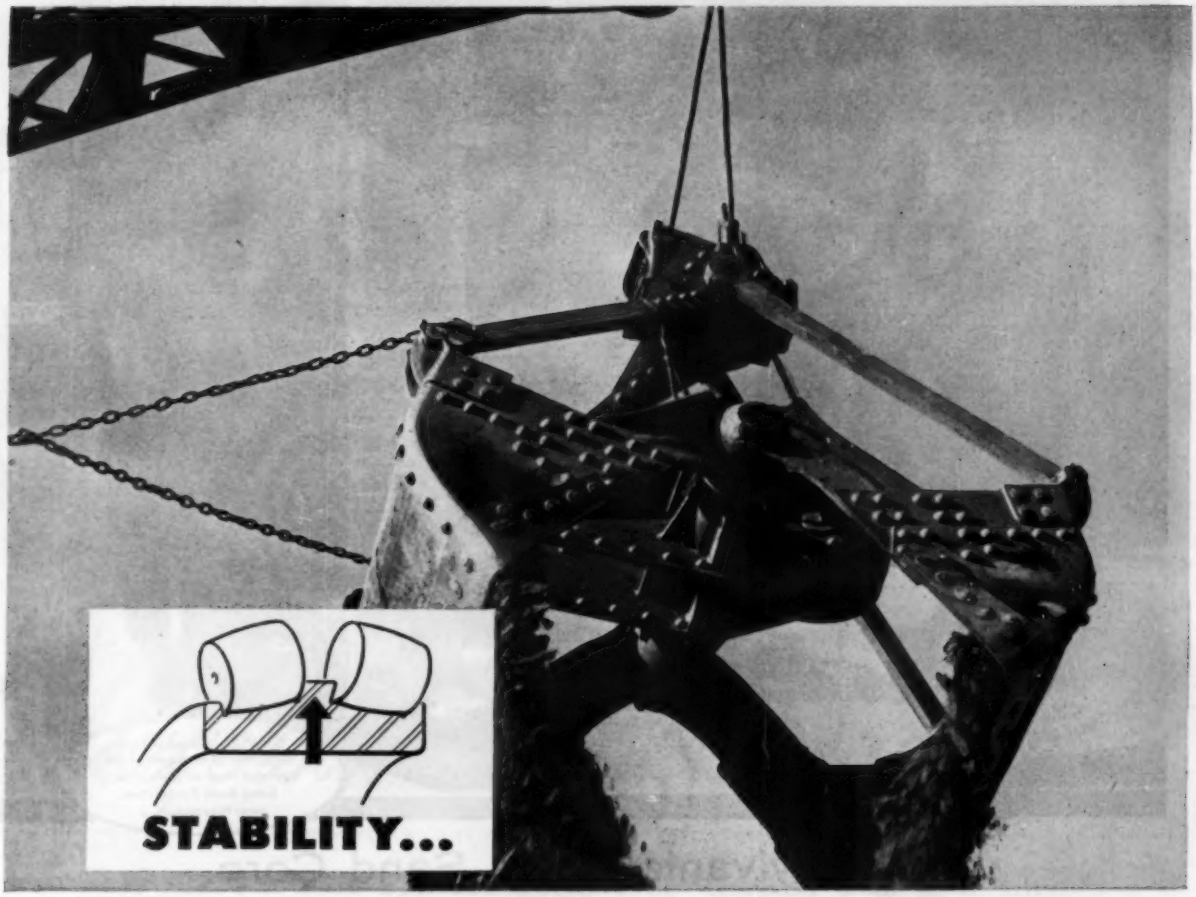


● The Eagle Iron Works has developed a positive acting electric-hydraulic power-operated bleeder valve to control proper depth of settled sand in their water scalping tanks which are used in conjunction with Eagle fine material screw type washer-classifier-dehydrators. With the new valve, the units provide better water scalping action and improved classification. ↑ (71)

● A new line of telescopic hoists and matching dump bodies for use on tandem axle trucks, is announced by The Galion Allsteel Body Co. The new hoist and body combinations are reported to carry as much as 1500 lb. more legal payload on modern trucks of equal g.v.w. rating than can be carried by conventional bodies of similar size. Shown is the outrigger mounted 66381 Duoscopic hoist with 12N-4 body. → (72)

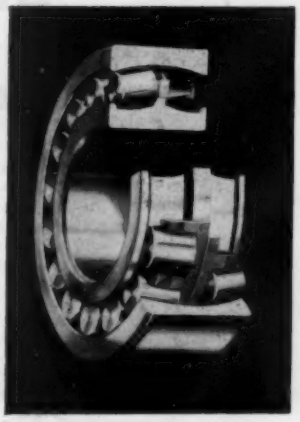


IN THE CRUSHED STONE INDUSTRY, TORRINGTON BEARINGS *are used in many applications, including crushers, screens, shovels, cranes, pulverizers, grinding mills and rotary kilns.*



TORRINGTON Spherical Roller Bearings

are designed with integral center flange on inner race to provide positive radial stability and positioning for thrust loads



This center flange guides the rollers accurately and friction is reduced to a minimum.

Other performance-building features include accurate geometrical conformity between races and rollers to provide ultimate load carrying capacity; carefully heat-treated races and rollers for maximum resistance to shock and wear; one-piece machined bronze cage for each path of rollers to allow thorough lubrication and give freedom of operation.

These are some of the reasons why TORRINGTON SPHERICAL ROLLER BEARINGS give long, satisfactory performance.

TORRINGTON SPHERICAL ROLLER BEARINGS are available from stock with either straight or tapered bore, for shaft or adapter mounting.

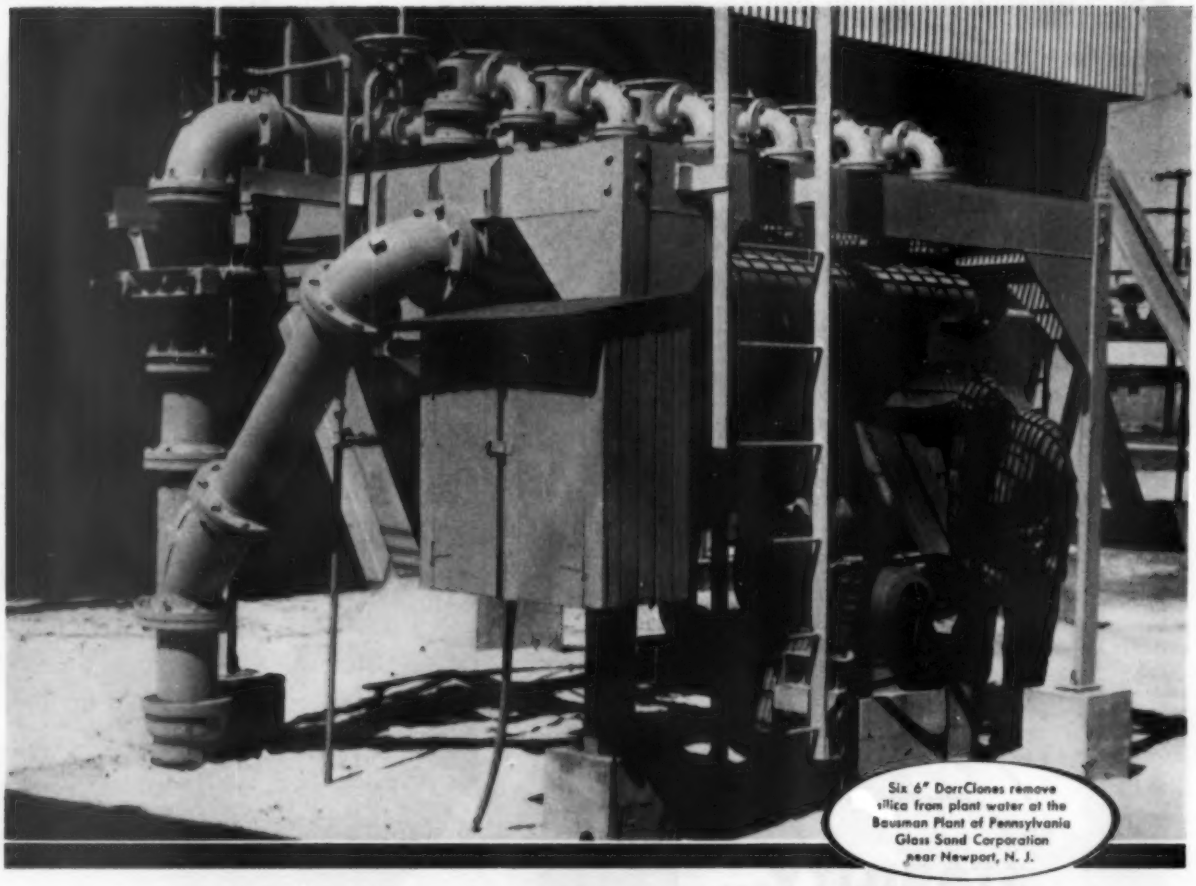
Specify TORRINGTON and get these operational advantages in your equipment.

THE TORRINGTON COMPANY
South Bend 21, Ind. • Torrington, Conn.

District Offices and Distributors in Principal Cities of United States and Canada

TORRINGTON SPHERICAL ROLLER BEARINGS

Spherical Roller • Tapered Roller • Cylindrical Roller • Needle • Ball • Needle Rollers



Six 6" DorrClones remove silica from plant water at the Bausman Plant of Pennsylvania Glass Sand Corporation near Newport, N. J.

Pennsylvania Glass Sand Corp. Cleans Water Supply with **Six 6" DorrClones* Operating Under Hydrostatic Head...**

Operating Cost Negligible

An unusual operation . . . yes, because of the absence of a pump in operating a battery of six 6" rubber lined DorrClones which remove fine silica from waste water.

Here was the problem — Overflow from a 12 ft. wide classifier, dewatering 70 to 80 tons of silica per hour, was returned to a supply pond. Although this flow contained only 0.3% to 0.4% solids, continuous build-up of 12 to 15 tons of silica per day in the pond necessitated periodic dredging.

Here's how it was solved — Six DorrClones, each handling 100 gpm, were mounted side by side and manifolded to an 8" feed header. Operating pressure of 10-11 psi is supplied by hydrostatic head. This pressure differential is the result of the installation of the cyclone at ground level, roughly 30 ft. below the classifier. Flow is controlled to each unit by rubber pinch valves. Overflows discharge to the common header carrying cleaned water to the supply pond. Underflow is collected in a sump and pumped to the tailings dump. Recovery of 99.7% of the silica, discarded with plant tailings, prevents accumulation of solids to the water supply . . . reduces solids loading in the pond to 50 pounds per day. Operating costs of the 6 DorrClones are negligible because no power is required due to the available hydrostatic head, and low pressure operation minimizes wear.

We'd like to tell you more about how DorrClones can be used in your flowsheet. Just drop a line to Dorr-Oliver Incorporated, Stamford, Conn.

*Trademark Reg. U.S. Pat. Off.

DORR-OLIVER
INCORPORATED
WORLD-WIDE RESEARCH • ENGINEERING • EQUIPMENT
STAMFORD • CONNECTICUT • U.S.A.

New 30" x 26" Rolls

Greatest secondary crushing capacity ever offered in a plant of this weight

Giant Capacity

Gives you far more fine crushed material per hour. Has the ideal crusher for the big 4' x 12' screen

Universal 880 Senior "R"

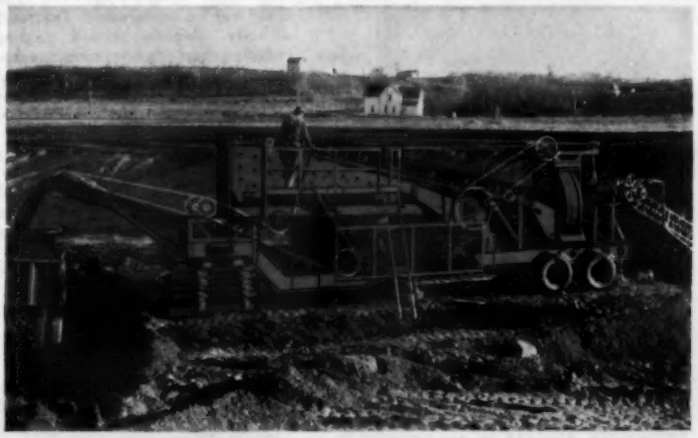
10" x 36" Jaw • 30" x 26" Roll Crusher • 30" Conveyors • 48 sq. ft. Screen

You want a plant that delivers screened and crushed material at a record rate and produces it at lower cost per ton. This is it!

The 880 Senior "R" teams a huge 48 sq. ft. screen with the biggest roll crusher ever offered, big, rugged 30" conveyors and a high capacity 1036 jaw crusher to give you a plant unequalled for high production in its weight class.

It's easy and economical to operate, too. You can adjust the jaw discharge quickly while standing on the ground—insures full control over primary crushing at all times. Dual clutch control on delivery conveyor speeds up truck loading of finished material. Plant operator or truck driver can control conveyor discharge.

Add to this—trouble-free V-belt drive, head-drive front delivery conveyor, extended operator's platform, plus the dozens of other advanced Universal features . . . and you've got a big, profitable, easy-operating plant that can't be matched. Write for illustrated bulletin, today!



Universal Senior 880 "R"—designed to meet highway weight limitations

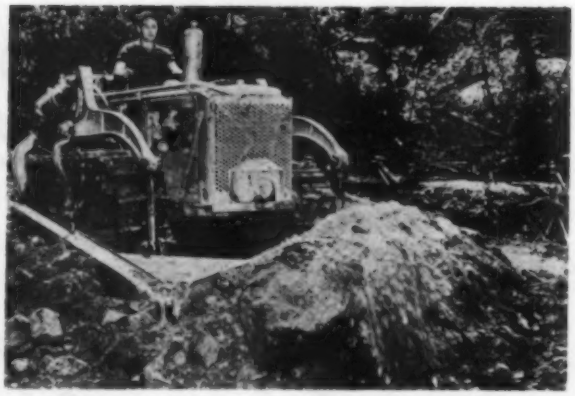
PETTIBONE UNIVERSAL
In Cedar Rapids Since 1906

UNIVERSAL ENGINEERING CORPORATION

619 C Avenue N.W., Cedar Rapids, Iowa

A Subsidiary of Pettibone Mulliken Corporation, 4700 W. Division St., Chicago 51, Illinois

● International Harvester Co. announces a series of hydraulic bullgrader and bulldozer blades matched to their T-6, TD-6, T-9, TD-14A, and TD-18A crawlers. The bulldozer blade assembly is solid welded without pin connections, providing a rigid, level blade. The bullgrader blade, connected by pins to the main frame, may be horizontally angled or vertically tilted. ➔ (73)

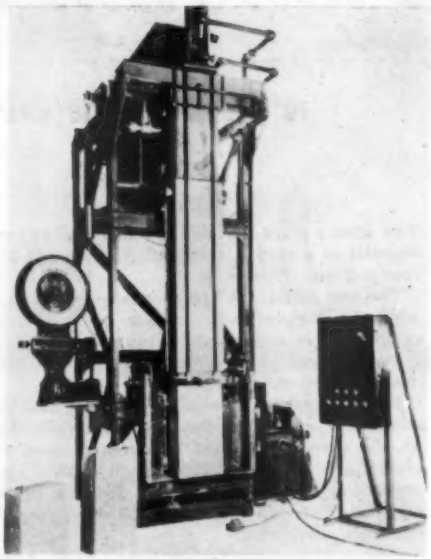


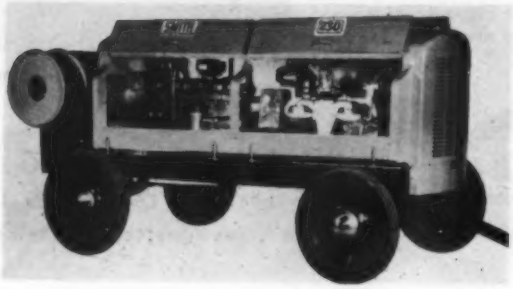
● Modern "Speed-o-Matic" controls are available for the first time on heavy-duty, ¾-yd. machines with the introduction of the LS-88 shovel-crane by the Link-Belt Speeder Corp. The firm says the power hydraulic controls make all load handling and machine movements smooth, safe, fast, and precise. The movement of short-throw levers meters pressure for full control of power for all machine functions. ➔ (74)

● Industrial Radio Corp. is now marketing the Model A Pak-Fone — a 2-way portable radio with a 3-way power supply. The Pak-Fone may be operated as a central control station when powered by 115 V.A.C.; as a mobile unit when powered by an auto battery; or as a completely portable station using its self-contained batteries. Clear, FM voice signals are reproduced on the built-in loud speaker. ➔ (75)

● A new engine wear meter has been announced by The Gerin Corp. The manufacturer says it is a gauge permanently attached to any engine which warns the operator when there is fuel dilution, water or anti-freeze leakage, running on dead filters, wrong grade make-up oil, and similar troubles. The meter responds to any variation in viscosity which is said to be the best indicator for changes in crankcase oil which the operator must guard against to avoid rapid wear of vital parts of the engine. ➔ (77)

● Plagued by packaging costs? The Ruberoid Co. found an answer to that problem and at the same time was able to improve the merchandising aspects of their products. Previously, they had used bags of porous construction for packaging asbestos; but because they were stretchable, the contents could not be compressed. The result was a bulky, illegibly printed package. A reducing and compression packer designed by the Packaging Machinery Division of Union Bag and Paper Corp. in co-operation with the Ruberoid Co. now makes it possible for Ruberoid to package their asbestos in multiwall paper bags which reduce bag volume by 50% and take printing well. Perhaps Union Bag and Paper Corp. can help you improve your packaging appearance and lower its cost. ➔ (76)





● The new Smith 230-P is the largest portable model yet offered in their line. Powered by a Chrysler Ind. 22 engine, it offers smooth 6-cylinder, single-stage compression with 4 1/16 in. bore, 413 cu. in. displacement, and is rated at 230 cu. ft. per minute. It will operate two 80 lb. rock drills or two light-duty wagon drills. ➔ (78)

CABLE AND MINE EXPERIENCE enable Anaconda to design and build shovel cable that resists razor-sharp rocks, water, sun, heat, cold, and — most important — run-overs.

This cable was "built" in our mines to perform better in yours

If you were a cable manufacturer as well as a miner, you could use your mine experience to build cable better than others.

But since you aren't, it will pay you to buy your cable from Anaconda—who *is* both cable manufacturer *and miner.*

FOR SHOVEL CABLE

Years of mine experience . . . of cable testing and improving . . . have taught us how to make a cable that *stays on the job longer under all conditions.* It's Securityflex* Type SH-D cable.

New, job-tested, high-grade butyl insulation assures better resistance to heat, water and compression. And new neoprene jacket makes this cable even tougher and more abrasion-resistant.

For Type SH-D, *or other shovel cable,* let Anaconda mine and cable experience pay off for you. See your Anaconda Distributor. Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y. 55821

*Trade Mark

ANACONDA®
MINE CABLE

FLAT-TWIN CABLE

Improved stranding, new insulation, new grounding wire, and neoprene jacket make this a superior cable for shuttle cars, continuous miners, loaders, drill trucks, cutters.

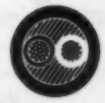
POWER CABLES

AnacondA Types W & G are rugged, sturdy and long-lived. Used for mine power, shovels, continuous miners, loaders, drill trucks, cutters.

SHOVEL AND DRILL CABLES

Securityflex* Types W and G are used with small shovels, self-propelled drill trucks, pumps and a-c mining equipment. For higher voltages, Type SH cables (shielded) are recommended.

SECURITYFLEX CORDS



Unexcelled for strength, wear resistance and long life. Type SO (heavy-duty) provides superior service on remote control and hand drills.

TROLLEY WIRE

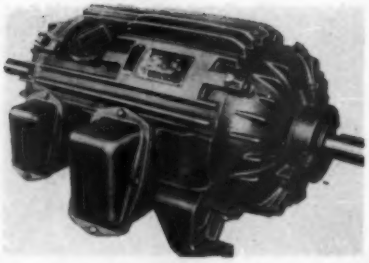
FEEDER CABLE BARE OR INSULATED

TELEPHONE WIRE

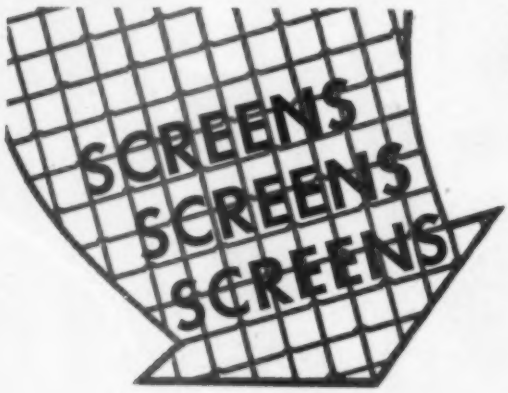
SHOT-FIRE CORD

WELDING CABLE

● A complete line of full ¾ yd. machines has been announced by the Wayne Shovel and Crane Division of the American Steel Dredge Co. Three of the new Wayne crane-excavators are already in production—the crawler-mounted Model 70, and two truck-mounted units. The basic ¾ yd. machine is never loaded with unneeded accessories and as a result, initial investment costs are substantially lowered. A full line of optionals is, however, available. A 19-ft. trench hoe boom permits a 31 ft. 2 in. reach and a digging depth of 20 ft. 5 in. ← (79)



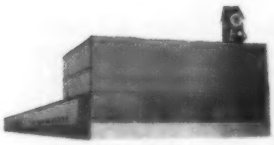
● Allis-Chalmers has released a new line of totally-enclosed non-ventilated and totally-enclosed fan-cooled wound-rotor motors. Stator, rotor, slip rings, brushes, and brush rigging are all within a single enclosure. Available at 1800 rpm and slower speeds in frames 284 to 505, the motor can be furnished either in standard enclosed or explosion-proof construction. ↑ (80)



See us at Booth 2032-2034 Materials Handling Exposition, Chicago, May 16th to 20th.

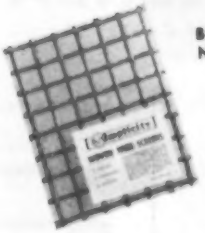
for Immediate Delivery

from SIMPLICITY'S HUGE warehouse stock



New SIMPLICITY Screen Plant

SIMPLICITY Woven Wire Screens in a wide range of wire gauges and openings are available for shipment from huge stocks in our warehouses within a few hours after receipt of your order. Edges formed and banded to fit any type of vibrator. Newly expanded production facilities permit fast action on special orders.



Bulletin No. 66

FOR COMPLETE DETAILS

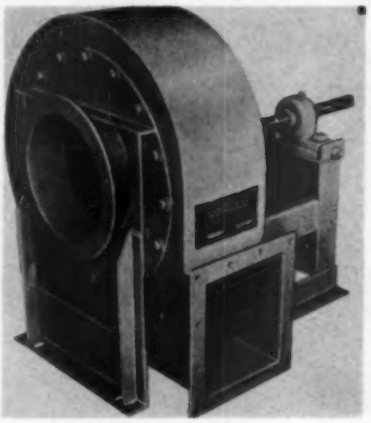
Write today for Bulletin No. 66 describing the complete line of SIMPLICITY Woven Wire Screens. SIMPLICITY Screens are expertly woven and do a fast, accurate job of sizing and separating aggregates of all types. Good abrasion resistant qualities insure long life and dependable service with minimum downtime for repairs or replacement. Phone us for immediate shipment of your rush orders.

Sales Representatives in all Parts of U.S.A.

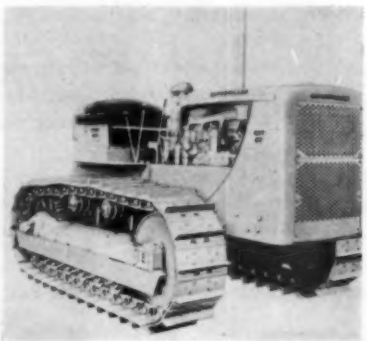
FOR CANADA: SIMPLICITY MATERIALS HANDLING LIMITED GUELPH, ONTARIO

Simplicity
TRADE MARK REGISTERED

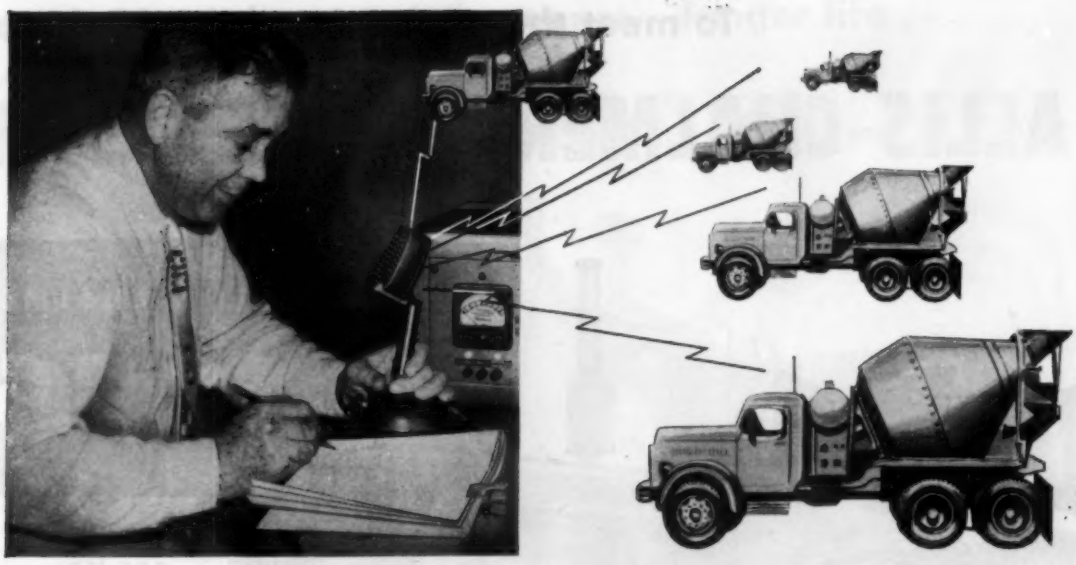
Engineering Company • Durand 12, Michigan



● The Dracco Corp. is now making available their industrial fans formerly produced only as components of Dracco dust control systems. Specialized fans are available for conveying explosives, gases up to 800 degrees F., or materials of a corrosive nature. Inlet diameters vary from 11- to 38-in., pressures to 17 in. S.P., and capacities from 500 to 46,000 c.f.m. ↑ (81)



● Increased horsepower and engine speed highlight many new engineering improvements which have been introduced in the new D7 track-type tractor announced by the Caterpillar Tractor Co. The 128 hp. engine has a maximum drawbar pull of 28,700 lb. An engine balancer reduces vibration and permits the 4-cylinder engine to operate at 1200 rpm with the same degree of smoothness as a 6-cylinder design. ↑ (82)



2-way radio **production** control

helps you pour **more** concrete with **fewer** trucks

Constant radio contact with every one of your trucks and service cars gives you *control* over your entire operation and more work and profits out of each truck.

By quarterbacking close plays right from his chair, your dispatcher can eliminate costly emergencies before they happen . . . can cut costs a dozen ways.

Motorola 2-way radio saves you $ $ Dollars per day per truck, not only paying for itself, but earning extra profits for you from the *first day* it's installed. Write—wire—or phone, TODAY.

Motorola will furnish the equipment YOU need on the terms YOU want — cash purchase, installment plan, lease (with or without equity) . . . with optional installation and maintenance all included in a single contract.

Messages like these cut costs, make profits for you.

Dispatcher to truck 17 — "Customer just called from Johnson pour — forms not ready . . . skip it and double over to Becker job at 7th and Walnut — dump load there and report."

Truck 4 to dispatcher — "Niles School job needs just 8 more yards of mix to complete."

Dispatcher to Batching Plants — "8 more yards needed for Niles . . . then cut."

Truck 11 to dispatcher — "Got a flat 10 seconds ago . . . rush a spare out — 2 miles from town on Highway 17."

Dispatcher to truck 11 — "Truck on way . . . will be out in 8 minutes — don't worry."

Trucks are rerouted instantly by radio when necessary, or emergency help dispatched.

Driver lets dispatcher know when he arrives, job progress, when he'll be back.

Motorola
2-WAY RADIO

Motorola Communications & Electronics, Inc.
A SUBSIDIARY OF MOTOROLA, INC.
4501 AUGUSTA BOULEVARD, CHICAGO 51, ILLINOIS
ROGERS MAJESTIC ELECTRONICS LTD., TORONTO, CANADA

Motorola consistently supplies more mobile radio than all others combined— proof of acceptance, experience and quality. The only COMPLETE radio communications service — specialized engineering . . . product . . . customer service . . . parts . . . installation . . . maintenance . . . finance. "The best costs you less — specify Motorola".

To meet the stepped-up needs of industry....

ALLIS-CHALMERS PRESENTS TWO

ALLIS-CHALMERS TS-360

280 HP

15-YD CAPACITY, STRUCK

20-YD CAPACITY, HEAPED

NEW BIG-YARDAGE WORK CAPACITY!

Power that pays

The TS-360's great new Allis-Chalmers engine spearheads a whole new power train that offers more rim pull at lower speeds for better loading, hauling and spreading performance; faster acceleration, easy shifting and quick getaways. Combined with new 20-yd capacity, this all adds up to fast, high-volume, high-profit work cycles.

New operating ease and safety

In addition to big-job power and gearing, the TS-360 Motor Scraper offers everything an operator needs to work easily, yet efficiently . . . new Double-Safety air brakes, new selective steering, direct electric starting, new multiple-disc cable control . . . and many others you'll want to know more about.

Strength to back it up!

The new TS-360 is built around a new, all-welded, heavy steel main frame that makes possible the service accessibility of unit construction. What's more, there's an all-new final-drive gear train, with new gears, shafts and bearings. These and many other advantages mean more work done, lower maintenance cost and longer equipment life.

Nowhere can you match these two in the amount of work they do!

... for more power—better performance—longer life ...

NEW, POWERFUL DIRT MOVERS

ALLIS-CHALMERS

HD-21

204 NET ENGINE HP

44,000 LB

BIGGEST, MOST POWERFUL CRAWLER IN PRODUCTION...ANYWHERE!

New standards of output

The HD-21 introduces the new Allis-Chalmers engine and a great new power transmission team. Together, they provide extra speed with any load, extra pulling power at any speed . . . wider speed ranges and more range overlap. And with its advanced design torque converter (*the result of 15 years of leadership by Allis-Chalmers*) the HD-21 puts its power to work with less shifting than ever before possible . . . to help you reach a new high in efficient, profitable production!

New standards of durability

From the new Allis-Chalmers diesel with "follow-through" combustion to new, heavier Tru-Dimension track, the HD-21 is built to take today's big loads in stride, and come back for more. Here are just a few more of the long-life features you can't get from anyone but Allis-Chalmers . . . at any price: all-steel Box-A main frame, straddle-mounted final-drive gears, 1,000-hour truck wheel lubrication, oil-enclosed track release mechanism.

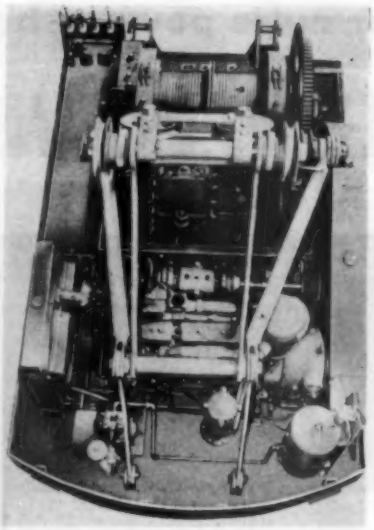
New low cost per unit of work

The HD-21 offers 20 percent greater over-all performance . . . provides a new measure of tractor value. Add the *planned* approach to service offered by Allis-Chalmers dealers, and it's the ideal team for men tackling today's big jobs.

ALLIS-CHALMERS

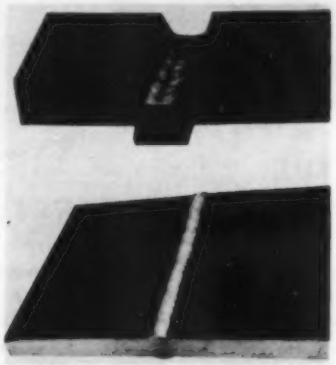
TRACTOR DIVISION • MILWAUKEE 1, U. S. A.

● The top photograph shows the new Allis-Chalmers TS-360 diesel powered motor scraper with a 15 cu. yd. struck and 20 cu. yd. heaped capacity. The cab on the 360 is optional equipment. Below it is a photograph of the new HD-21 diesel powered torque converter crawler tractor. This 44,000 lb. tractor has a 204 net engine horsepower. The scraper is built for rugged duty on rough terrain and is able to work and maneuver where others have difficulty. The HD-21 tractor, biggest and most powerful made by the firm, features a new high-capacity cooling system, a new master clutch, redesigned transmission, and a wrap-around radiator guard. ← (83)

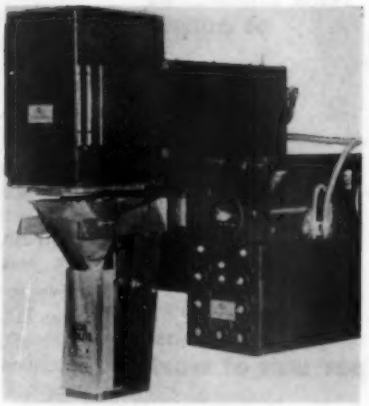


● The machinery deck of the Marion 83-M excavator shows drum, clutch and independent propel shafts, and power unit arranged for easy accessibility. Special features make it a 60-ton lifting crane. As a 2 yd. shovel it offers many applications and its heavy-duty construction. The machine has a high retractable and self-raising gantry which is raised or lowered under power in a matter of minutes. An independent boom hoist, optionally available, provides "power up and power down" in the raising and lowering of loads and uses machinery power instead of a brake to control lowering of the boom. For extra stability in crane service, crawler width spreads to 13 ft. 5 in. and 19-ft. crawlers are available. ↑ (84)

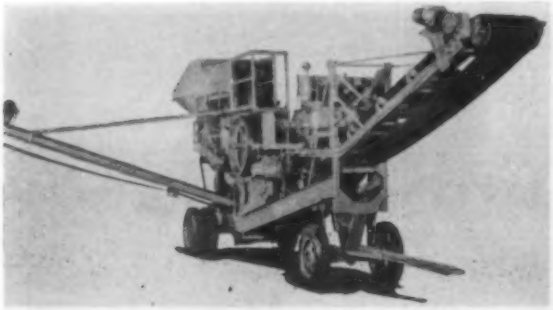
● Three new telescopic hoists and weight-saving bodies are being offered by The Heil Co. to make greater legal payloads possible in the 21 to 30 ton capacity class. The new Heil hoists may be mounted inside or outside of the chassis frame rails to fit any make of tandem truck or semi-trailer. The firm says elimination of all deadweight in the bodies makes for a bigger payload than is possible with similar bodies of this capacity. The telescopics achieve a dumping angle to 42 to 50 degrees. ↑ (85)



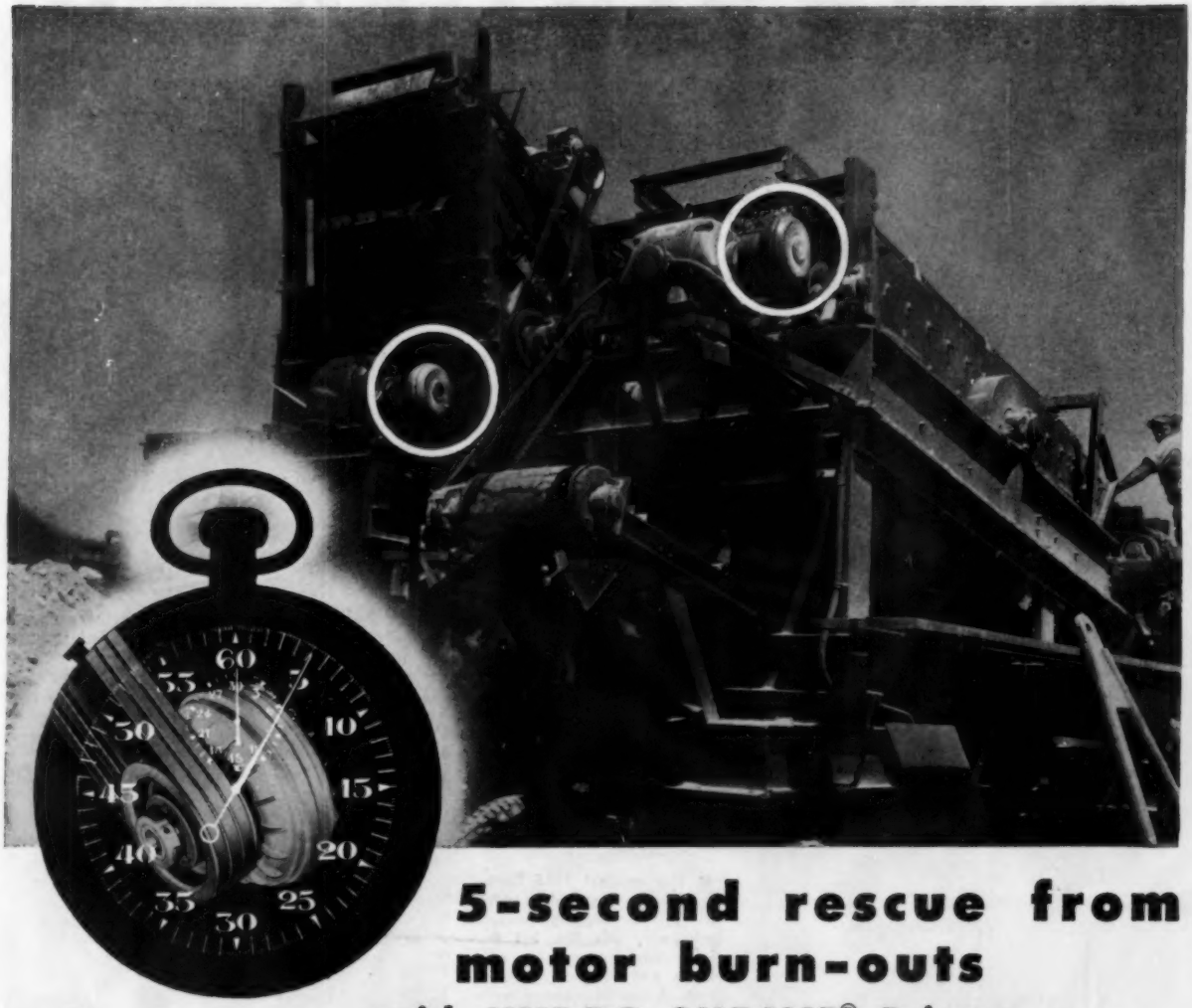
● The Lincoln Electric Co. has released Jetweld 2, the second electrode in its newly developed line of electrodes with powdered metal in their coating. It is designed especially for deep groove welding, has excellent wash-in, easy slag removal, and produces a smooth, clean, flat cover pass. Welding speeds can be increased 30% and faster because of these qualities. It is designed for high-speed welding of butt and deep groove joints to weld at the lowest possible cost per foot of weld with excellent x-ray qualities. ↑ (86)



● The Thayer Scale and Engineering Corp. is now offering their 700G filling scale, the newest unit in a complete line of filling scales. It may be used for filling 1, 2, 5, and 10 lb. bags. A larger unit is now being used for filling 25, 50, and 100 lb. bags with rock dusts and other hard to handle materials. An outstanding feature is that the scale leverage system contains no knife-edge pivots which would have a tendency to become dull and inaccurate with use. The non-flooding feeder is designed to handle a wide range of products running from 8 to 135 lb. per cu. ft. The machine may be furnished with a number of control arrangements. ↑ (88)



● Baldwin-Lima-Hamilton Corp., Construction Equip. Division, has introduced a newly-designed, Austin-Western, single-pass, diesel-electric portable crushing plant. Capable of producing 2 sizes of material, the plant has good application on jobs where high portability and ease of operation are required. Weighing 20,000 lb., components include a 2x6 double-deck screen. ← (87)



5-second rescue from motor burn-outs

with HYDRO-SHEAVE® Drive

Every time the temperature dropped, Stoneridge Limestone Company had a severe starting problem. Bringing their vibrating screens up to full speed under load—*with mechanical drive*—ate up 15 minutes before the cold bearings and belts loosened up. Production time was lost. But even worse, the unavoidable result was motor overheating from severe and prolonged starting loads . . . a condition pointing straight to motor burn-outs in a matter of time.

To solve the problem, Stoneridge called in their Authorized Twin Disc Hydraulic Dealer—Rockford Tool & Transmission Company.

The solution was quick and easy: Twin Disc HYDRO-SHEAVE Drives, slipped on the output shaft of motors powering the vibrating screens.

Results were immediate. The silken "slip" of *fluid* within the HYDRO-SHEAVES—*eliminating* mechanical connection—picked up the heavy starting load smoothly, automatically . . . permitting the motors to accelerate to normal rpm *within 5 seconds*, preventing overheating and inevitable burn-outs—and increasing production by eliminating the 15-minute warm-up period.

In addition, the cushioning effect of the HYDRO-SHEAVE Drives *absorbs* the shock loads, overloads, and vibrations inherent with the operation.

Whether you are driving equipment with motors or engines, if your installations are between ¾ and 850 hp you can *improve performance*—and obtain *positive protection*—with Twin Disc Fluid Drives. Write *today* to Twin Disc, Dept. DS, Racine for *new* Bulletin 144-D, giving *complete* description of the 10 different models of Twin Disc Fluid Drives—illustrating their wide variety of input, output combinations plus their ease of installation.

Twin Disc 10.6 HYDRO-SHEAVE Drives boost performance, protect motors and driven parts on 4′ x 10′ triple-deck vibrating screen (left) and 4′ x 12′ double-deck vibrating screen (right) at Stoneridge Limestone Company, Rochelle, Ill. HYDRO-SHEAVE is easily installed on either engines or motors. Capacities from ¾ to 50 hp.

TWIN DISC

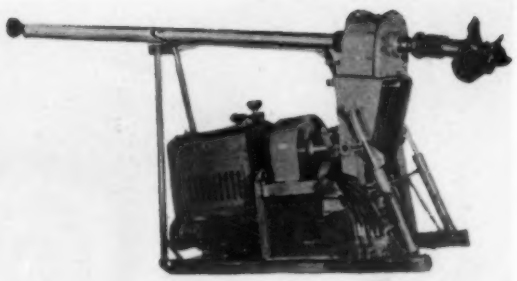
TWIN DISC

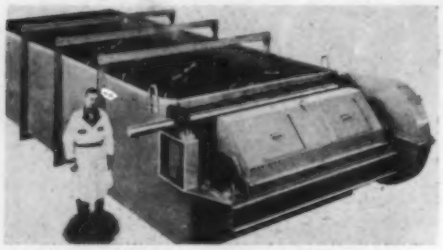
Fluid Couplings

TWIN DISC CLUTCH COMPANY, Racine, Wisconsin (Hydraulic Division) Rockford, Illinois

● A new 15-ton capacity CraneMobile is being offered by Bay City Shovels, Inc. It is powered by a 404 cu. in. displacement Hercules gasoline engine, has single wheels in front and dual tandem wheels in rear. Ample flotation is assured with ten 10:00x20 12-ply heavy-duty mud and snow grip tires. A heavy-duty main transmission with 3 speed auxiliary provides 12 forward speeds to a maximum of 44 mph and three reverse speeds. Front and rear extendable outriggers are standard equipment. The machine with standard equipment, including 30-ft. boom, weighs 41,500 lbs. ▲ (90)

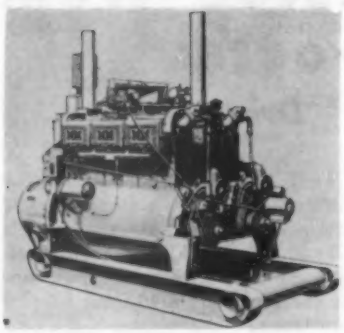
● The new Acker all-purpose digger provides angular adjustment of the drill head in 2 directions and permits operation at any angle through a full 360 degree range. A built-in hoist and a sheave wheel at the top of the mast handles loads up to 750 lb. The mast can be raised or lowered by hydraulic power giving maximum clearance. → (89)





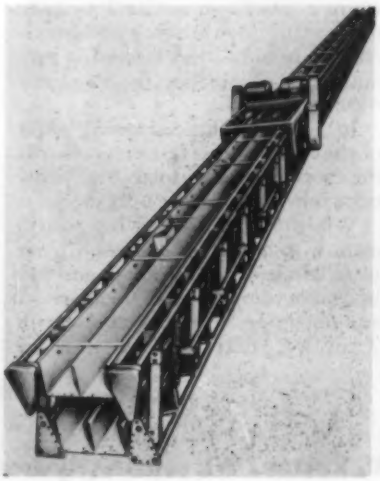
● A new king-size log washer has been introduced by Eagle Iron Works. Design is such that this log washer can be used successfully for washing stone, crushed rock, or various ores. Tub width is 9 ft. 4 in. and tub length is 30 ft. While capacity depends largely on size of material and amount of dirt to be removed, the unit is rated at 150 tph. The unit is powered by a 150 hp. electric motor through an enclosed reduction unit. ▲ (91)

● Tractor operators will welcome this dust mask that filters out annoying and toxic dusts and vapors. Made by the General Scientific Equip. Co., the mask provides effective protection without being clumsy or uncomfortable. ▲ (92)

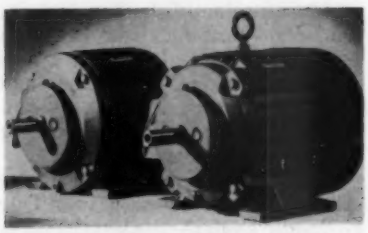


● High horsepower in the range from 252 to 290 is provided in the new, heavy-duty Minneapolis-Moline 1600-12A industrial power unit. The unit operates with 12 volts on either natural or LP gas. Dual 6-cylinder engines of the MM 800-6A class, mounted in parallel, are geared to a single power take-off shaft. ▲ (94)

● This smallest 1955 Terra-Trac loader, complete with its ½ yd. digging bucket, admirably fills the bill for jobs requiring extreme mobility and rugged construction. A new high-speed trailer is available which tilts making it possible to load the tractor on it in the shortest possible time and with the least skill. It can easily be attached to your truck and do those small jobs which don't require larger forces. → (93)



● The longest Balanced Conveyor built by Syntron Co. was recently completed. A compulsory, swinging mass type of equipment, the Model 2-B with stainless steel troughs is suspended from the ceiling and remotely controlled from the operating floor. The 20 ft. wide by 100 ft. long conveyor conveys 5 tons per hour. → (95)



● A new line of totally-enclosed a.-c. motors has been announced by the Reliance Electric & Engineering Co. Shown are the Reliance protected (left), and the enclosed fan-cooled model (right). Regardless of mounting positions, the motors offer complete protection against drip, splash, and falling objects. New neoprene gaskets afford a positive seal between the frame and conduit box. The frame extends beyond coil heads to give full protection to the windings. ▲ (96)

ROCK RATED! P&H Model 955-A (2½ yd.)

P&H MAGNETORQUE* gives you 20% more output!

If you still have not experienced P&H Magnetorque *this is the time to do it!*

Why now? Because the growing volumes for the new highway program will place heavier burdens than ever on your production equipment. You'll want the swing speed Magnetorque supplies for maximum output.

P&H MAGNETORQUE does it for you! Faster swings — with quicker starts and stops — give you cycles 20% faster than any other 2½-yard machine. Magnetorque will deliver it *now* — and years from now. With Magnetorque there's no friction, no wear. Lasts the life of the shovel.

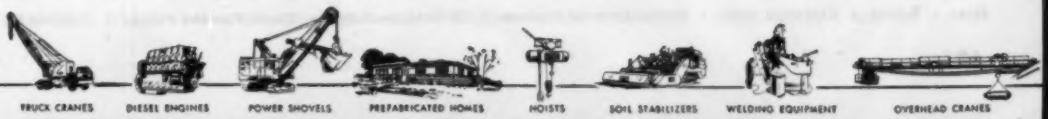
If you're looking for the best investment, remember: The low-cost shovel is the one with the high cycle. You can bank on P&H Magnetorque! Write for literature. P&H Model 955 A — 2½ yd. P&H Model 1055 — 3½ yd.

*T.M. of Harnischfeger Corporation for electro-magnetic type coupling.

P&H POWER CRANE & SHOVEL DIVISION

HARNISCHFEGER CORPORATION • MILWAUKEE 46, WISCONSIN

the P&H *Line*



IN THE AG

Here's U. S. Rubber belting hauling aggregate for Chief Joseph Dam

You're looking at one of the biggest aggregate plants ever set up. It supplies aggregate for concrete for the big Chief Joseph Dam in the State of Washington—the dam that will have the world's largest single-unit powerhouse under one roof, the dam that will rank second only to Grand Coulee in operating capacity.

This aggregate ranges from fine sand to heavy boulders as large as 20″ in diameter. The rock breaks clean, leaving sharp edges which are good for concrete interlock but bad for ordinary haulage conveyor belting. To handle this most critical portion of the haulage, United States Rubber Company conveyor belts were selected. Now in their fifth construction season, the belts are still going strong, giving *trouble-free* service. This is another instance of U. S. Rubber's Three-Way Engineering Service: "U. S." belt engineers work with the designers of the conveyor system and the engineers of the dam—to make sure of providing the *right* belt.

U. S. Belting and Engineering Services are obtainable through any of the 27 "U. S." District Sales Offices, or write to the address below.

CLOSE-UPS OF SOME OF THE CRITICAL POINTS

"U. S." Research perfects it

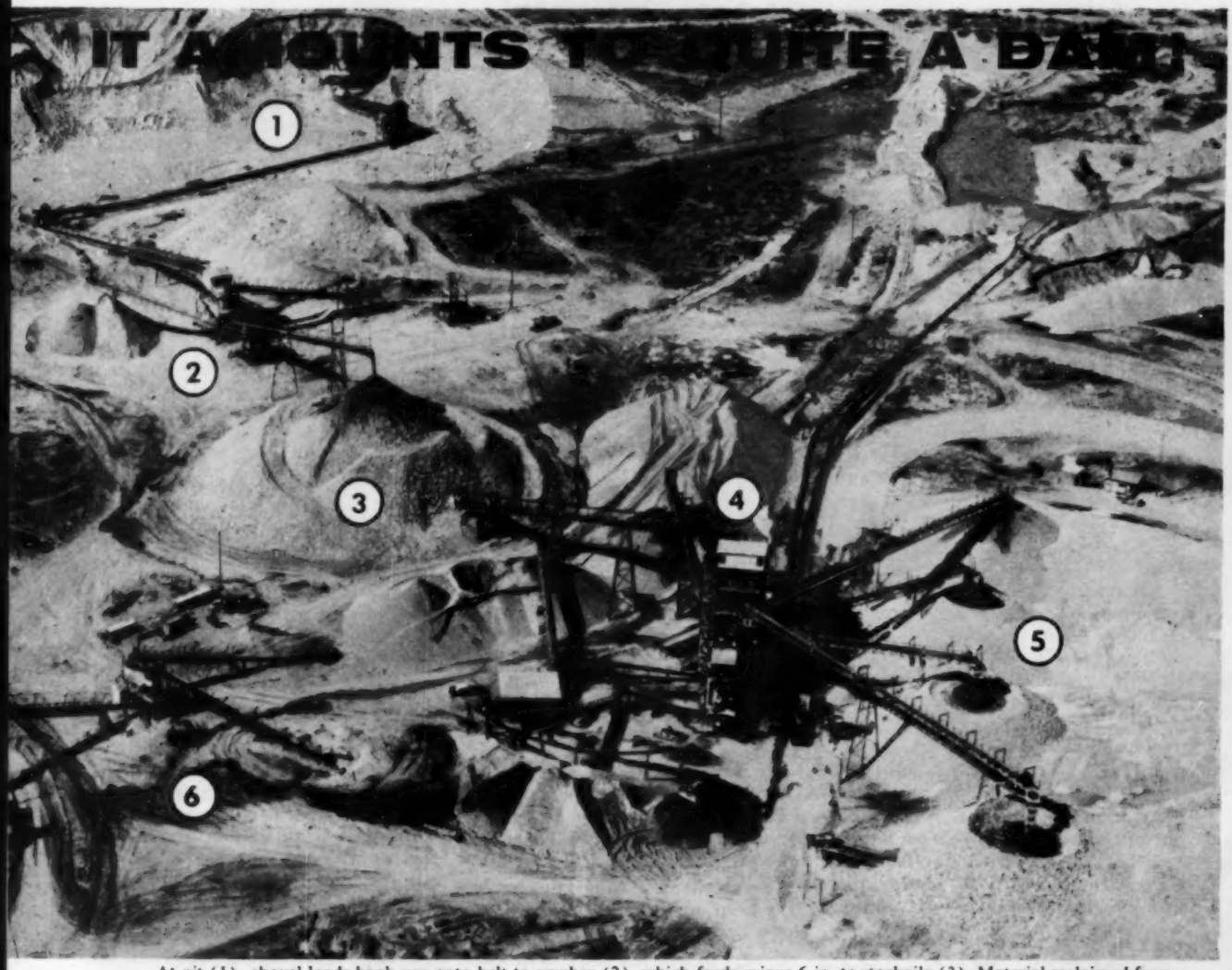
"U. S." Production builds it

U. S. Industry depends on it.

Close-up of shovel loading bank-run onto U. S. Rubber belt—first step on its journey throughout the aggregate plant.

UNITED STATES RUBBER

Hose • Belting • Expansion Joints • Rubber-to-metal Products • Oil Field Specialties • Plastic Pipe and Fittings • Grinding Wheels • Packings • Tapes



At pit (1)—shovel loads bank-run onto belt to crusher (2), which feeds minus 6-in. to stockpile (3). Material reclaimed from stockpile goes to top of screening tower (4), from which conveyors radiate to coarse-aggregate piles (5) and sand piles (6).

Note large and jagged aggregate on "U. S." belt. The belt starts the material from the pit to the rock plant.

"U. S." belt discharging aggregate onto one of the immense surge piles.

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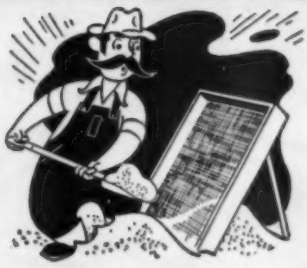


by Ray L. Smith, Jr.

"HARDLY Worthwhile," was the title of a letter passed on to us recently, telling the tale of a direct-mail idea which reputedly put Churchill's Conservative Party back in power. Title of the booklet was *What the Labor Government Can Do For the Workers.* Inside, was the complete text — "RESIGN." The pages were all blank except for that word and a footnote on page 4: "In the interest of paper economy, please use this paper to wrap your meat ration in." The stinger was the size of the pages, 2 by 3 in. We could all learn a lesson from this story and take advantage of the fact that it pays to be original in our direct-mail campaigns.

. . . Another example supporting the out-of-groove approach has been brought to our attention. A lad just out of college wrote a collection letter which put to shame all other letters used by credit men. The results were amazing. "Dear Sir: If you do not pay your bill immediately, we will take steps that will astonish you." This writer, who is limp today following an all night battle with a French poodle puppy raises his head to caution you not to take for granted the same letter would solve your collection problems.

Blind Spot

ONCE there was a girl who was very near-sighted. Her boy friend was constantly kidding her about it—and so one night she decided she would really show him that she wasn't as near-sighted as he thought.

Taking a needle from her sewing basket, she craftily stuck it in a huge pine tree standing next to the porch.

That night as they were sitting in the porch swing she said, "Why, honey, isn't there a needle sticking in that huge tree?"

"Needle! What needle?" said he.

"Just a minute, I'll get it for you," she replied. So she rushed down the steps and tripped over a cow.

Not Letter Perfect

THOSE of you who doubt the power of letters should consider carefully the following, which was clipped from a recent issue of *Readers' Digest.*

Suddenly called out of town, Paul Harvey, the Chicago news commentator, told a new secretary, "Write Allis-Chalmers in Milwaukee. Say that I can't keep that appointment Friday. I'm off for Texas. I'll telephone when I get back. Sign my name." Upon his return, Harvey found this carbon waiting:

Alice Chalmers
Milwaukee, Wisconsin
Dear Alice:
I'm off for Texas and can't keep that date . . .

Harvey promptly phoned the tractor division and said, "I hope you haven't received a certain letter."

"Received it!" came the reply. "It's been on the bulletin board for three days!"

More of the Same

THIS reminds us of a letter we saw some years ago. We've always held high respect for the Navy—still do—but we must take a dim view of this "Directive issued by Potomac River Naval Command." It states:

"Effective immediately, the practice of endeavoring by words, gestures, or otherwise to beg, invite, or secure transportation in any motor vehicle not engaged in passenger carrier, by officers and/or enlisted men or women of naval service at any point within the boundaries of the Potomac River Naval Command is forbidden."

Translated, that means: "Don't hitchhike." Cutting out these long-winded and nonsensical government "directives" might help to reduce that budget.

"Of course, you have no objection to the grave-yard shift."

Potpourri and Succotash

A girl asked by her teacher to parse the word "kiss," replied: "Kiss is a noun, also a conjunction, is never declined, it is common, never proper, is singular, also plural, and agrees with me."

The doctor was questioning the new nurse about a patient.

"Have you kept a chart on his progress?"

"No," replied the blushing girl, "but I can show you my diary."

The young customer beckoned to the new waitress. He said, looking rather embarrassed, "Could you tell me where the smoking room is?"

"Oh," the waitress replied, "You can smoke right here at the table."

Hillbilly *(to a new bride after he has completed their cabin)*, "Well, woman, how de yew-all like your new home?"

Wife: "Not bad at all, but I don't see no door."

Hillbilly: "Yew plannin' on agoin' somewhere?"

You've got to hand it to the income tax people—or they'll come after it.

Time for spring fever and sharp winds—shed your woolens cautiously.

Thermoid Hose designed specifically for use in quarries

Thermoid designs and manufactures many types of hose built to give longer service and lower operating costs in a wide variety of specific applications. Here are three that are ideal for rugged quarrying and construction work:

THERMOFLEX—Mandrel-built air hose for extreme service and direct connection to compressors. Smooth, black abrasion-resistant cover.

VERSICON—Most versatile hose ever developed. Handles air, water, oil, gasoline, dilute acids and gases. Ideal for use with air-operated tools.

#325 CL SUCTION HOSE—Heavy duty wrapped hose reinforced with rugged wire enclosed in a woven cord carcass. Long wearing tube and cover resists weather and abrasion. Can be restored to shape after crushing.

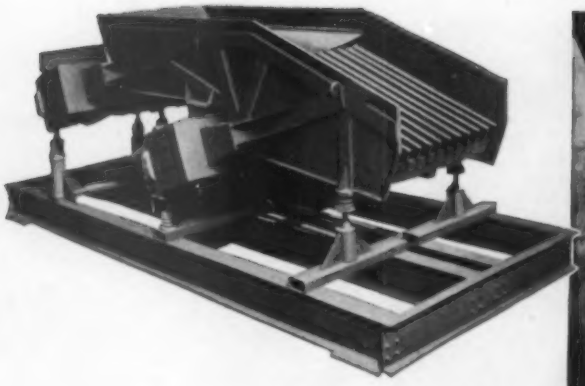
Thermoid research is responsible for new, better hose construction which makes Thermoid Hose more durable . . . easier to handle. Quarrying and construction work also demands the best in Conveyor Belting and Multi-V Belts. Ask your Thermoid Distributor for complete information on all these Thermoid Products. Or if you prefer, write direct.

Conveyor & Elevator Belting • Transmission Belting
F.H.P. & Multiple V-Belts • Wrapped & Molded Hose

Thermoid

Rubber Sheet Packings • Molded Products
Industrial Brake Linings and Friction Materials

Thermoid Company • Offices & Factories: Trenton, N. J., Nephi, Utah



Fed by Vibrating Feeder, Rock Buster at Karsh Stone Co., Bryant, Ind., turns out 90%-1½" rock at rate of 150-175 TPH. Owner reports gradations of sizes acceptable to most markets.

NO SURGES
NO IDLE EQUIPMENT
with this
GRIZZLY and ROCK BUSTER

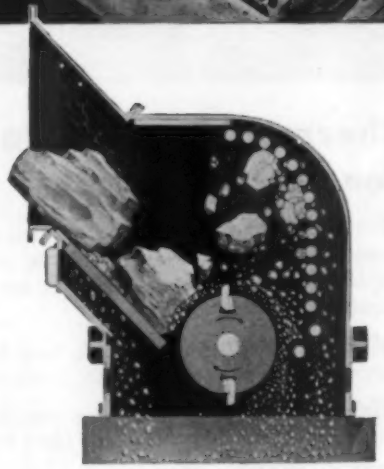
This power-packed Jeffrey Vibrating Grizzly Feeder and Rock Buster Crusher team licks the problem of surges and idle equipment! Aggregate and cement plant operations get smooth and even flow from primary dump hopper to finished cube-shaped product.

The Vibrating Grizzly Feeder (upper left) combines accurate feed control with a rough sizing operation designed to by-pass fines. Won't clog . . . handles large fluctuations in tonnage and feed size without mechanical adjustment.

The Rock Buster (lower right) is a powerful impact-type crusher that can reduce hard friable material from a 36" maximum feed to 90% minus 1½" in a *single pass.*

Crushing elements mounted in a rugged single rotor literally explode rock to top of crusher where it is further broken by impact with heavy rods. Collisions among pieces cause more breaking. A cubical product in various sizes is produced—quickly, and with minimum wear and tear on parts.

What a team! It will increase your profits, lower "down" time . . . best of all, put real flow in your plant by eliminating surges and keeping all equipment busy.



Write for Rock Buster Bulletin 854, Vibrating Equipment Catalog 870

THE JEFFREY MANUFACTURING CO.

ESTABLISHED 1877

Columbus 16, Ohio

sales offices and distributors in principal cities

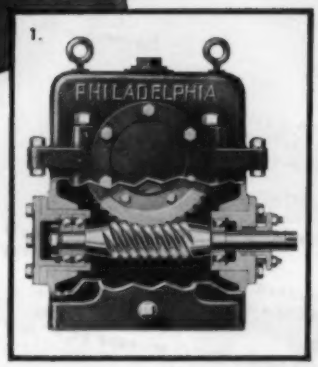
PLANTS IN CANADA, ENGLAND, SOUTH AFRICA

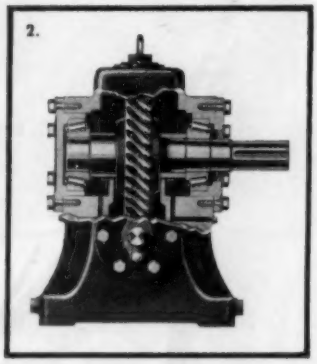
IF IT'S MINED, PROCESSED OR MOVED
. . .IT'S A JOB FOR JEFFREY!

STURDY
RUGGED
EFFICIENT
LONG LIFE
LOW UPKEEP

precision built

HEAVY DUTY WORM REDUCER





1. Heavy Duty, Type "AT" Reducer, showing the rugged worm and shaft construction; generous ball bearing mountings, and the easy-to-get-at, leak-proof stuffing box.

2. Same Reducer, showing section through worm wheel shaft. Note generous spread of roller bearings, and efficient design of oil wells surrounding bearings.

. . . and we really mean "Precision Built,". . . in fact, we have put as much research, design and skill into these heavy duty reducers, as is put into the finest time-pieces or scientific instruments.

In order to assure the user of Long, Efficient Service Life with lowest possible maintenance, materials and manufacturing standards are very rigidly maintained at "Phillie Gear":

Worms are of alloy steel with carburized hardened and tempered threads; shafts and threads are precision ground and polished after heat-treating.

Worm Gears are made from highest quality chilled-cast nickel bronze.

Housings are oil-tight quality grey iron . . . designed to assure maximum rigidity and heat radiation, with ample oil reservoir.

Units are available with Worms above or below the Worm Gear; also with shafts up or down for Vertical Drives.

A complete range of sizes is available to cover any application up to 265 H.P., with ratios from 3-5/8:1 to 6300:1. They are built to provide efficient and dependable power transmission under the most rigorous conditions over a long period of time.

For detailed information write for latest catalog WG.

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ERIE AVE. & G ST., PHILADELPHIA 34, PA.
NEW YORK • PITTSBURGH • CHICAGO • HOUSTON • LYNCHBURG, VA.
Virginia Gear & Machine Corp. • Lynchburg, Va.

Industrial Gears & Speed Reducers
LimiTorque Valve Controls
Established 1892

Well Known Contractor Screens
750,000 TONS IN 5 MONTHS
USING 2 SECO SCREENS

C. E. CLEMENT, PRESIDENT AND TREAS.

C. W. CLEMENT, VICE PRESIDENT

Clement Brothers Company
INCORPORATED
HIGHWAY 18 BY-PASS — TELEPHONE 4-5377
Lenoir, North Carolina

November 17, 1954

Screen Equipment Co., Inc.
1754 Walden Avenue
Buffalo 25, N. Y.

Attention: Mr. Fielding

Dear Mr. Fielding:

We thought you might like to know the figures involved in our West Virginia Turnpike job on which we used two SECO screens.

We crushed over 750,000 tons of stone that was fed to the SECO screens as 8" material and our finished product was 2" material.

We operated 10 hours a day, six days a week, and experienced no down time due to screen trouble with SECO while 6000 tons per day was screened.

We were extremely pleased with the trouble-free service given by SECO.

Looking forward to seeing you in Kentucky, I remain

Very truly yours,

C. E. Clement

C. E. Clement

CEC:nrc

AFTER ALL . . . IT'S PERFORMANCE THAT COUNTS . . . and

Clement Bros. Meet W. Virginia Turnpike Specs. For 2" Stone in Record Time!

Photograph of Clement Bros. plant taken on-the-job

THOSE rugged, dependable SECO'S keep proving themselves when the going is toughest. As on this job for Clement Bros. fast, trouble-free screening of large tonnages accurately sized was the order of the day . . . six days a week for five months . . . and SECO delivered without a letdown.

SECO
TRUE CIRCULAR ACTION
VIBRATING SCREENS

Screen Better With SECO'S On Your Job

Whether you're screening heavy or light, moist or sticky materials, there's a right SECO for your job. Over 350 models in single, double, triple and 3½ deck designs.

Send for Catalog No. 204 today!

SCREEN EQUIPMENT CO., INC.
BUFFALO 25, NEW YORK

Hats Off To The New West Virginia Turnpike

88 miles of brilliantly engineered and superbly constructed superhighway. Extends from Charleston, West Virginia's capital city, to Princeton at the Virginia border.

YOU CAN'T BEAT SECO FOR TROUBLEFREE PERFORMANCE

HOBBS TRAILER

HELP YOU HAUL MORE PAYLOAD!

- LOWER EQUIPMENT COSTS
- REDUCE MAINTENANCE COSTS
- INCREASE OPERATING EFFICIENCY
- INCREASE YOUR PROFITS

Take full advantage of Your State Bridge Formula Laws

HOBBS *Schonrock Cable Dump* TRAILERS *CAN TRIPLE YOUR TRUCK EFFICIENCY*

Your truck equipped with Hobbs Schonrock Cable Dump Trailer hauls three to four times as much dirt, sand, gravel or aggregate as one equipped with an ordinary dump body. This trailer can be built in any length—long enough to give you full benefit of maximum payloads allowed by bridge formula laws. This is made possible through exclusive, patented booster cam fifth wheel.

HOBBS SELF-LOADING FLOATS

ENABLE ONE MAN WITH WINCH-EQUIPPED TRUCK TO LOAD AND UNLOAD AS MUCH AS 100,000 LBS.

Ideal for moving ditching machines, bulldozers and other heavy equipment. Specifications available on request for single axle rated at 30,000 pounds and tandem axles rated at 50,000, 75,000 and 100,000 pounds.

HOBBS WINCH AND GIN POLE BODIES

Increase the usefulness of your utility truck with a Hobbs Winch and Gin Pole Truck Body. It performs heavy lifting, winching, loading and carrying. Hobbs heavy duty Headache Posts let you winch from a side angle, carry chain and boomers. Bodies for single and tandem axle trucks: 1½ to 12 tons.

For Complete Information, Specifications and Prices Contact

HOBBS MANUFACTURING COMPANY 609 NORTH MAIN STREET FORT WORTH, TEXAS

SALES AND SERVICE IN 38 STATES AND MAJOR CITIES — DISTRIBUTORSHIPS AVAILABLE IN SOME AREAS

How Long Will a PAYLOADER® Last?

Model HM clocks over 18,000 hours

WALT KEELER, *Pres.*
Walt Keeler Company, Inc.

He says," . . . these machines have given us a more economical performance than the track-laying tractors, due to the abrasiveness of the sand and gravel they are subjected to. Furthermore, rubber-tired tractors are faster, which is also an asset to our operation."

WALT KEELER has used a fleet of tractor shovels for many years on his sand, gravel and ready-mix operations at Wichita, Kansas.

He bought his first "PAYLOADER" tractor shovel, a four-wheel-drive model, in 1949 and added two more later. Last December he traded in the oldest on a new one. This old 1949 unit had clocked over 18,000 hours of use — nearly twice what is considered normal for construction equipment — and was still in fair condition. Needless to say, Mr. Keeler is sold on "PAYLOADER" tractor shovels.

This factual report is not intended to create the impression that every "PAYLOADER" will give every owner 18,000 hours of satisfactory service. But it is an example of what proven "PAYLOADER" design, plus "PAYLOADER" Distributor service and intelligent preventive maintenance by the owner can accomplish.

THE FRANK G. HOUGH CO.
750 Sunnyside Ave., Libertyville, Ill.

Send catalog covering all seven "PAYLOADER" MODELS AND the many useful attachments for them.

Name .....

Title .....

Company .....

Street or Box No. .....

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SAY "HUFF"

PAYLOADER®

MANUFACTURED BY
THE FRANK G. HOUGH CO. • LIBERTYVILLE, ILL.
SUBSIDIARY—INTERNATIONAL HARVESTER COMPANY

Cooley's New South Denver Plant Tailored To Fit Existing Needs

Necessary fine sands obtained after experimentation with various flowsheets

By WALTER E. TRAUFFER

another ON THE SPOT report

C. G. COOLEY, president of the Cooley Gravel Company, Denver, Colo., has long had the reputation of being one of the most inventive producers in the sand and gravel industry, and also of having the courage and tenacity to carry out his ideas in spite of obstacles which would deter most men. His latest project, which is now fully carrying out the goal set for it, is a really remarkable sand and gravel plant in the southern part of Denver. This was built not only to supplement the gravel output of his other plant, the famous "Gravel Gertie", in the north part of Denver, but also to produce types of fine sand in which the other deposit is deficient. Now that this plant is operating satisfactorily, Mr. Cooley is going ahead with plans to convert it into a floating operation. This would have the same advantages as the north plant of eliminating hauling to the plant and of providing unlimited stockpiling capacity without rehandling.

This writer first became aware of Mr. Cooley's genius in 1934 when

General view of a part of Cooley's South Denver plant showing, from left to right, the primary conveyor from the plant receiving hopper, the cone crusher, the revolving screen, the sand cone, screw washers, etc.

visiting his sand and gravel plant at Chillicothe, Mo.,[1] which he still operates. Later Mr. Cooley diverted some of his effort to the placer dredging of gold in the Colorado Rockies and to coal mining in the same area. When the 17-mile Denver-Boulder Turnpike was built, he produced the aggregates for the Boulder end from a temporary sand and gravel plant at Boulder, Colo., and that for the Denver end from the North Denver plant, then new.

Developments had made gold dredging unprofitable, and this fact helped Mr. Cooley to decide to enter the sand and gravel business in the Denver area on a permanent basis, using the North Denver plant. In order to utilize to the fullest possible extent equipment already on hand, he decided to rebuild one of his two dry-docked gold dredges into what was said to be the world's only floating preparation-stacker plant[2]. Fed by a dragline, this plant stacks sized aggregates in stockpiles along the shore, eliminating the multiple-hauling and rehandling expense common to other types of plants. This plant deservedly received wide publicity when it went into operation in 1951, and is known to the industry as "Gravel Gertie". As a by-product this plant also produces gold at the rate of about 4 cents per ton.

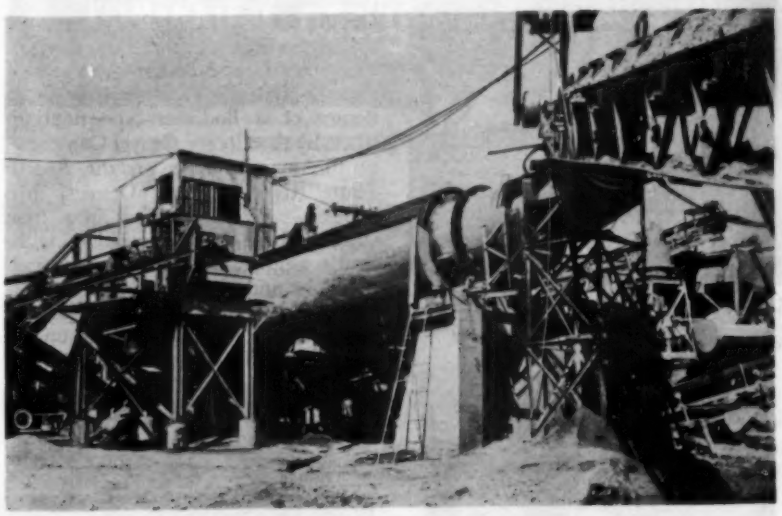
This North Denver operation has been highly successful; and the deposit is excellent, except that the 40 percent sand content is not enough to balance the gravel. Again influenced by the fact that he had a second gold dredge and most of the necessary equipment, Mr. Cooley located a deposit about 5 miles south of downtown Denver, on the South Platte River, which would make up for this sand deficiency. With the other plant 10 miles north of downtown Denver, the company would also be in an excellent competitive position for the entire Denver area. The deposit contains about 65 percent sand, of which about 25 percent is 16-mesh to 3/16-in. material locally known as "squeegee"; for this there is at present little demand. This plant was designed for an input of 300 t.p.h. (compared to the 260-t.p.h. capacity of the North plant), and it went into operation on September 10, 1953.

After the plant went into operation, it soon became apparent that

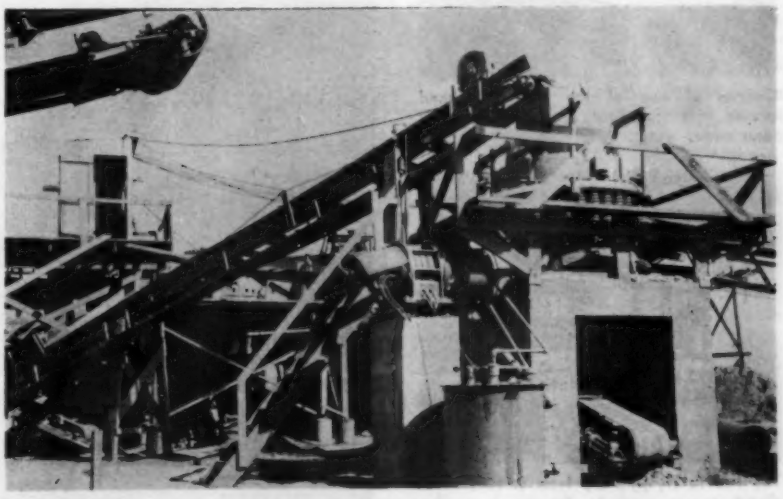
[1] See PIT AND QUARRY, *Gravel Firm Adds Scrubbing Equipment to Meet Changing Standards*, by W. E. Trauffer, August, 1934, pp. 35-40.

[2] See PIT AND QUARRY, *Reactivated Gold Dredge "Gravel Gertie" Proves Worth*, by Harry F. Utley, April, 1953, pp. 65-67, 75.

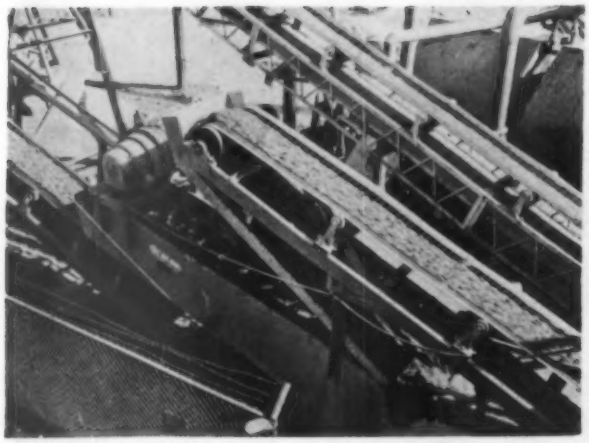
The walking dragline, with its 100-ft. boom and 3½-cu. yd. perforated bucket, feeding to the plant hopper.



The 5- by 40-ft. revolving screen, with its sand jacket, which makes the primary separation.



The 4-ft. standard cone crusher which reduces plus 1½-in. gravel from the revolving screen.



The single-screw washer which removes trash and dewaters ¾- to 1½-in. gravel from the revolving screen.

Left to right: Frank M. Graham, sales manager; C. G. Cooley, president; Orville Enderud, chief engineer.

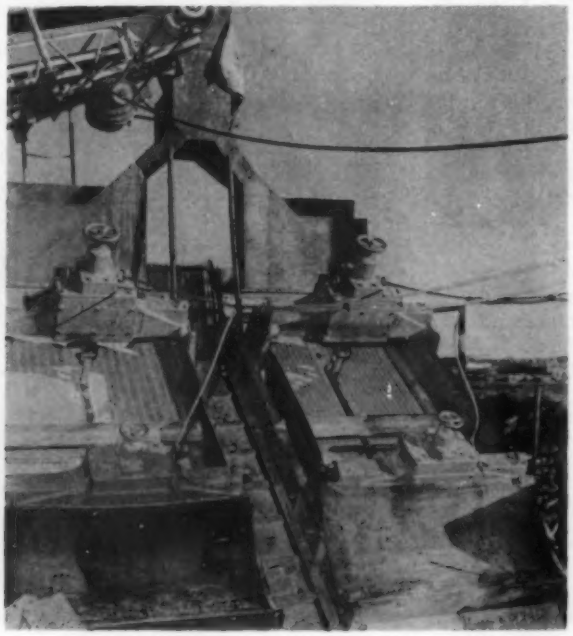
Closeup of one of the octagonal sand screens with the door open. Screening is done under water.

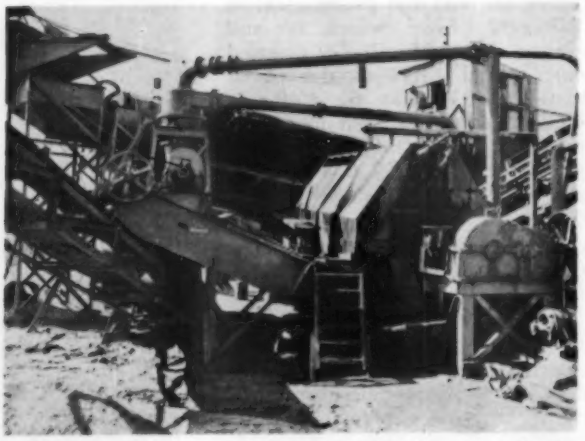
The two rotary-gyratory type screens which divert coarse sand to the gyratory disc-type crusher.

there was one major "bug" — the sand was "harsh" and would require extra processing to make it acceptable for concrete and mortar. The successive steps taken to overcome this condition are best described by Orville Enderud, chief engineer.

"In describing the testing, design, construction, and operation of a stationary pilot plant and then the final design of a Bodinson-type floating plant by the Cooley Gravel Company at the new location on the South Platte River in South Denver, this project can be divided into five stages. There was no problem with coarse aggregate except the removal of sticks and driftwood, but it was known that the sand was too coarse or contained too much in the upper sizes (plus No. 16 minus No. 4) and was deficient in the finer sizes (minus

The two electric vibrating screens which remove the coarse sand for recrushing from the crushed sand which is blended with natural fine sand.





The two octagonal sand screens with twin-screw and centrifugal classifiers which process the fines.

No. 50, minus No. 100, minus No. 200), with a fineness modulus of 3.40, producing harsh concrete.

"First stage: rotary sand screen— Soon after beginning testing operations in October, 1952, we attempted to find a practical method of screening or classifying this sand at the No. 16 size, which we soon found out was not going to be an easy job. Because of its angularity, this sand plugged or blinded vibrating screens rather quickly. The square foot of area required to screen 200 t.p.h. of minus No. 4 sand, making a No. 16 size separation with about one-half passing and one-half retained on the No. 16, became too large for practical use on our floating-type plant.

"After several months of experimentation and tests we finally arrived at a rotary screen design, using an octagon-shape screen with wedge-wire and Bixby-Zimmer 1-mm. continuous slot opening, with the screens running in water and practically all the screening done below water level. . . .

"Production was started with a feed of about 200 t.p.h. in September, 1953, and sand was produced with sieve analysis very close to the analysis we anticipated.

"Within a few days from the time we began furnishing material from

this plant on September 28, 1953, we were bombarded with complaints from cement contractors that the concrete being produced with our sand and gravel 'bled' badly and could not be finished properly. This was a problem we thought we had overcome by using the specially-built rotary sand screen and proper blending methods to produce a sand that was as well graded as possible. Due to these complaints we were forced to curtail the operation and take corrective measures.

"It was observed that the concrete sand, although it met standard specifications as to gradation, could be described as harsh and non-absorptive.

"Second stage: ball mill—During most of the month of October, 1953, we made intensive experimental tests in mixing concrete with different gradations and finally decided that a ball mill product would cure our difficulty.

"Steps were taken immediately to install a 6- by 6-ft. Colorado Iron Works ball mill that would grind 10 t.p.h. of squeegee (3/16 by No. 16 waste material) down to a minus No. 30 mesh sand. The mill was fed with a Jeffrey-Traylor tubular vibrating feeder, and the mill product was blended with the natural sand by means of a 2-in. Allis-Chalmers Model 2-SRL sand pump.

"In addition to the 10 t.p.h. produced by the ball mill, it was possible to blend additional 3/16 by No. 16 material into the concrete sand and thus increase by 15 to 20 t.p.h. our total sand production.

"The important result of adding ball mill fines to the natural sand was of a two-fold nature; first, we were able to market a sand that made concrete which was superior in its finishing and non-bleeding qualities; second, concrete made with this sand shows consistently higher breaking strengths than that made with competitive sands in the area, and also higher than that made with sand from this deposit without the ball mill fines.

"We also have been able to supply the market with mason sand of excellent quality and workability which has had very good sales acceptance.

"Third stage: 54 in. Gyradisc crusher—However, due to the poor natural gradation of the deposit, we were forced to waste from 25 to 30 percent of all material fed the plant, this waste material being a surplus in the ¼-in. by No. 16 range. We began investigating the various types of grinding and crushing machinery, and learned that the American Aggregates plant at Indianapolis, Ind., was achieving excellent results in fine crushing of gravel with a 48-in. Nordberg Gyradisc crusher, and that the Newton County Stone Co., Inc., at Kentland, Ind., was producing finely-crushed limestone with a 54-in. Gyradisc.

"By October, 1954, we had installed a 54-in. Gyradisc crusher, together with auxiliary conveying and screening equipment.

"At present, with a 200 t.p.h. feed to the plant, 50 to 70 t.p.h. of squeegee (No. 16 and No. 4) is delivered to the dewatering screw, which is then further dewatered in two Symons V-Screens to a moisture content of 2.3 percent. This material then is fed to the 54-in. Gyradisc, and the crushed product is returned to the two Tyler 4- by 10-ft. Hummers, which are equipped with Ty-Rod screens with .078 in. slotted openings on the upper half and .071 in. slotted openings on the lower half. Half of the feed to the Hummers passes through this opening, and the oversize is returned to the crusher feed belt. This results in a total feed to the crusher and Hummers of 100 t.p.h. having a moisture content of 1.8 to 2.0 percent and 50 t.p.h. of minus No. 10 product

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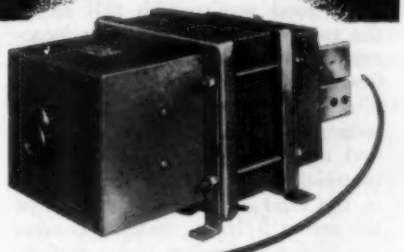

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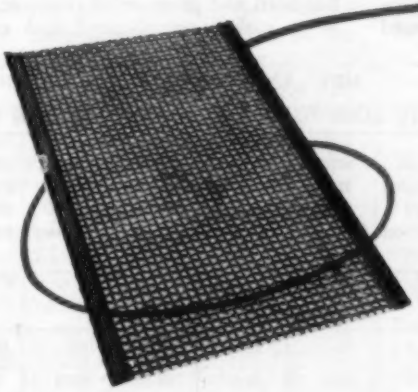

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Longer screen life — no manual cleaning increases screen life up to 800%.

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PIONEERS IN ELECTRIC SCREEN HEATING – FIRST IN THE FIELD OF LOW VOLTAGE AND HIGH AMPERAGE SCREEN HEATING

through the Hum-mers, which is blended with the natural sand.

"A small part of the crusher product can be drawn out of the circuit for use as asphalt aggregate with little effect on the production or gradation of the concrete sand.

"Typical gradations of the various sand products are as shown below.

"The installation and satisfactory operation of this Gyradisc crusher with drying and screening equipment required a great amount of investigation, tests, experimentation, and adjustments before making this a satisfactory operation; most of this investigation and testing were necessary because ours was the first installation for producing extra fines for concrete sand with this type of equipment.

"Fourth stage: loose-weave construction screen cloth on rotary screen—We have recently been experimenting with a special loose-weave, 7½-mesh screen cloth for our main trommel jacket. We have had some good results with this cloth; the main feature is that the looseness of the weave allows considerable flexing, which practically eliminates blinding. We now have two 4-ft. sections of this cloth on our trommel and are flowing the minus No. 10 material from these sections direct to the sand classifiers. A portion of the minus 3/16-in. material coming out of the succeeding jacket sections is also fed direct to the sand classifiers, and the remainder is flumed direct to the squeegee (No. 16 to No. 4) dewatering screw, thus eliminating the use of the rotary sand screens. After six weeks of testing and experimenting with these loose-weave screen cloths we decided to incorporate these screens in our final plant design and eliminate the rotary sand screens.

"These rotary sand screens, although they have done a very good job, require considerable maintenance, and naturally we wish to have as little machinery as necessary to do the job. Also, it was unnecessary to screen so fine after installation of the ball mill when the opening was increased from 1 mm. to 1½ mm. continuous slot, which is the same condition when using the Gyradisc crusher.

"Fifth stage: floating plant—By March 21 we hope to complete the final design of the floating plant for this South Denver operation. During March and April we hope to complete the construction of this plant, and then place it in operation some time in May.

"This plant will be very similar to our floating-type plant in North Denver, except that the new boat will have considerably more equipment. The flowsheet will include most of the items now in use except, of course, the field hopper and field conveyors, the ball mill, and possibly the rotary sand trommel. This has been and promises to continue to be a rather complicated and certainly a most interesting project."

The overburden on this deposit is very light and is removed separately and used as binder for road gravel. The plant can be run dry to process this material.

In the present plant, which in some ways can be considered a pilot plant, in the production of sand and gravel, a 3W Bucyrus-Erie electric walking dragline, with a 100-ft. boom and a 3½-cu. yd. Hendrix perforated bucket feeds over a 7-in. grizzly into the field hopper.

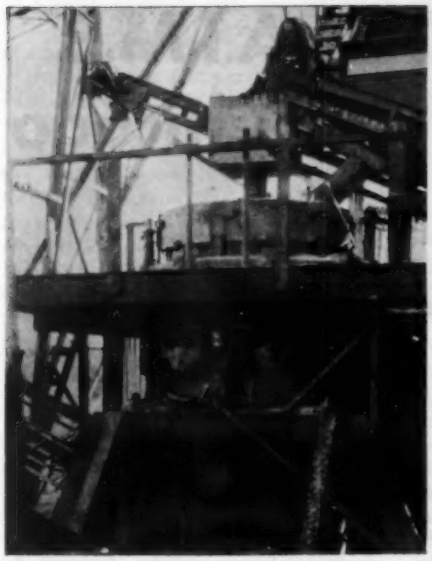
A 36-in. Telsmith reciprocating feeder discharges the material on the first of three 36-in. belt conveyors, 65, 80, and 115 ft. long, respectively, feeding through a hopper into the 5- by 40-ft. Bodinson gold-placer-type rotary screen. The first 5-ft. section has perforated plate with ⅜-in. round openings spaced 1½ in. apart; the second 5-ft. section has ⅜-in. round openings ¾ in. apart; the third 5-ft. section has ⅝-in. round openings; the fourth and fifth 5-ft. sections have 1-in. square openings. All of this plate is ¾-in. thick cast manganese steel. Around this jacket is the 8- by 20-ft. sand jacket with 12 ft. of 3/16-in., 4 ft. of ¼-in., and 4 ft. of ⅜-in. wire cloth. The plus 1-in. gravel from the end of the inner barrel goes to an attached screen section with 1½-in. round perforations.

The plus 1½-in. gravel is carried on a short 18-in. belt conveyor to a Symons 4-ft. standard cone crusher

SIEVE ANALYSIS OF VARIOUS SAND PRODUCTS

SIEVE SIZE	CONCRETE SAND					MASON SAND				6′ x 6′ Ball Mill Raw Product 10 t.p.h.	54″ Nordberg Gyradisc Crusher Product	
	A.S.T.M. Specs.	-No. 4 Pit Run	-1 m.m. Screening and Blending	With Ball Mill Product	With -No. 10 Gyradisc Crusher Product	-1 m.m. Screen	With Ball Mill Product	With -No. 10 Gyradisc Crusher Product	Average of 18 Mason Sand Analyses in U.S.		Crusher Run	-No. 10 From Hum-mer Screens
3/8	100	100	100	100	100						100	
No. 4	95-100	99.1	99.3	98.8	99.9	100	100	100	100	100	91.8	
8	80-100	74.7	90.3	88.7	93.0	99.5	99.9	99.9	98.6	99.0	68.9	100
10						98.4					58.8	99.5
16	50-85	45.9	76.7	70.1	69.1	82.8	92.2	85.4	88.6	93.0	43.2	90.6
30	25-60	26.9	46.1	44.3	40.6	49.3	61.2	52.5	64.1	77.0	26.7	60.7
40						34.0					21.3	50.3
50	10-30	11.1	17.1	19.6	18.1	21.1	26.0	24.2	24.2	56.0	18.3	37.2
80						8.6					11.8	26.7
100	2-10	3.2	3.7	7.5	7.8	5.6	9.3	10.4	4.0	36.0	10.1	20.4
200	0-5*		1.2	3.3	2.7	1.25	4.5	5.2		21.0	6.2	11.4
Fineness Modulus		3.39	2.67	2.71	2.72	2.41	2.12	2.276	2.20	1.39	3.36	1.96

* See A.S.T.M. Tentative Specifications for Concrete Aggregates (C33-52T).



The gyratory disc-type crusher which reduces excess coarse sand to a size suitable for asphalt.

This pneumatic-tired loader moves quickly from one stockpile to another for loading into trucks.

set at 1½-in. maximum opening. This crushed gravel is carried on another 18-in. belt conveyor to a 4- by 10-ft. Cedarapids 2-deck horizontal vibrating screen. The ¾- to 1½-in. gravel from this screen, along with the ¾- to 1½-in. gravel through the rotary screen section, goes to a short 18-in. conveyor feeding to a 33-in. by 15-ft. Eagle single-screw washer which removes trash from this material before an 18-in. belt conveyor carries it to a 21-cu. yd. truck-loading bin.

The No. 4 to ¾-in. gravel from both screens goes to a 24-in. belt conveyor feeding a 33-in. by 15-ft. Eagle single-screw washer for the removal of sticks and other trash. A 24-in. belt conveyor carries this material to a 21-cu. yd. truck-loading bin. An overflow chute discharges it to a pile from which it is rehandled or loaded into trucks.

The No. 4 to ⅜-in. pea gravel from the primary screen is carried by an 18-in. by 70-ft. belt conveyor to a stockpile.

The minus 3/16-in. sand from the revolving screen flows with the water to a pair of 6- by 6-ft. 8-in. octagon-shaped revolving screens, operating in parallel, which were designed for this operation. Each screen has three longitudinal sections with eight panels to the section, and these have 1-mm. (16-mesh) slotted wire cloth. Screening is done under water. With the slope of the screen it is 10 in. under water at the feed end and 14 in. under at the discharge end. Each screen section is bedded in rubber and has a ratchet or knocker ring around it. A spring-loaded knocker at the top keeps the screen cloth from blinding. Each screen is also equipped with 12 washing sprays supplied at 30 lb. pressure.

Lifter bars discharge the 1/16- to 3/16-in. coarse sand ("squeegee") from both screens to a 6-in. Amsco-Nagle pump which also rehandles all dirty water from the plant to settling ponds. A 300-ft. pipeline discharges to a dewaterer and then to the ponds. These rotary sand screens will not be used in the final design of the floating plant and will be replaced by "loose-weave" screen cloth on the main rotary screen jackets.

This pipeline can also feed the "squeegee" into the ball mill grinding circuit to provide 10 t.p.h. for grinding. This goes first to a dewatering wheel. A Jeffrey-Traylor No. 4 tubular electric vibrating feeder discharges into the 6- by 6-ft. Colorado Iron Works ball mill which is loaded with 10 to 11 tons of Colorado Fuel & Iron 2½- to ¾-in. steel balls. An Allis-Chalmers centrifugal pump feeds the product of the mill onto the first of the two sand-stockpiling belt conveyors.

The "squeegee" can also be fed direct from the two screens to a 24-in. by 12-ft. dewatering screw, which feeds a bucket elevator discharging into two Nordberg Symons V-screens. A 20-in. belt conveyor feeds the coarse from these screens to a Nordberg 54-in. Gyradisc crusher. An 18-in. belt conveyor takes the product of this crusher to a 21-cu. yd. truck-loading bin. This crusher-run product is an excellent aggregate, as is, for asphalt mixes.

The sand can also be discharged from this conveyor onto another which feeds two 4- by 10-ft. single-deck Tyler Hum-mer screens. The coarse from these screens goes back on the conveyor ahead of the crusher. The fines go on another belt conveyor and are blended with natural sands from the twin screws and the Dorrclone.

The fine sand (minus 1/16-in.) from the two octagonal screens goes to a pair of 20-in. by 15-ft. Telsmith twin-screw classifiers. The water overflowing the screws is pumped by an 8-in. United Iron Works pump to a 24-in. Dorrclone centrifugal classifier. This feeds the sand along with sand from the screws on the first of two 24-in. belt conveyors, 70 and 60 ft. long, respectively. The finished sand is discharged to a stockpile. The water from the Dorrclone goes to the "squeegee" pump previously described.

Rehandling of stockpiled material at this plant is done by a Bucyrus-Erie 22B dragline powered by a Caterpillar diesel engine and handling a 2½-cu. yd. Pettibone-Mulliken clamshell bucket. Also used for this purpose and for loading trucks from stockpiles are a Caterpillar D8 tractor with a bulldozer; a Pettibone-Mulliken 54-B Speedloader; and an Austin overshot loader, all mounted on pneumatic tires. All shipping is done by trucks, which are weighed on a Fairbanks-Morse 60-ton capacity scale with a Printomatic attachment.

At both plants everything possible is being done to reclaim for future use the land which has been ex-

(Continued on page 134)

Attendance Tops 3,000 at A.I.M.E. General Meeting in Chicago

Industrial Minerals Papers Cover Wide Range of Subjects

THE 177th general meeting of the American Institute of Mining and Metallurgical Engineers, held at the Conrad Hilton Hotel in Chicago, Ill., on February 14 to 17, 1955, was marked by a record attendance of 3,084 engineers, geologists, and other representatives of the mining and metallurgy fields. Included in this total were 354 ladies. A second record was set in the number of papers presented; in addition, the papers covered more fields than ever, with special attention given to uranium, special metals, and titanium. The impressive range of subjects was presented before the 12 divisions and branches of the Institute during the four-day affair. All meetings and social functions were well-attended and well received.

H. DeWitt Smith, retired vice-president of the Newmont Mining Co., was elected president of A.I.M.E. for 1955, succeeding Leo F. Reinartz. The incoming president was the principal speaker at the annual banquet and president's reception held on Wednesday, Feb. 17. At the banquet the various Institute medals and honors were presented.

At the welcome luncheon, Dr. John T. Rettaliata, president, Illinois Institute of Technology, said that today the engineers are called upon for leadership, for training, to share, to conserve, and to inform. The engineer must be willing to assume functions far beyond engineering itself. He felt that the hope for the future rests in the hands of the engineer and the scientist.

The Jackling Award was given to Edward D. Gardner, chief mining engineer, U. S. Bureau of Mines, for significant contributions to technical progress in the field of mining. In his lecture on *Mining Technology—Outlook for the Future,* given before the Mining, Geology, and Geophysics Division, he urged an accelerated mining research program. Mr. Gardner indicated that the outlook for the future of mining in America is bright.

Lilienthal's Address David E. Lilienthal, chairman of the executive committee, Minerals and Chemical Corporation of America, and former chairman of the Atomic Energy Commission, was the featured speaker at the Industrial Minerals Division Luncheon. He emphasized that we need vastly more basic knowledge of the fundamental properties and characteristics of industrial minerals, particularly of the more abundant ones. The needed basic research should be carried on in the same intensive measure as that applied to the metals, electronics, and petroleum industries.

This research is needed for business reasons and also to expand the field of knowledge. Basic research into the "why" of industrial minerals, he said, needs to be encouraged for much the same reason that explorations of minerals and petroleum is encouraged by our government by tax incentives for those who expend abnormally high amounts in such research. And public grants should be made to our universities and non-profit institutions for broad and deep research pursuits into the basic properties of industrial minerals, the knowledge produced to be open to everyone.

A list of the principal industrial minerals would probably include asbestos, bauxite, kaolin, bentonite and fuller's earth clays, diatomite, feldspar, fluorspar, gypsum, lime, lithium, phosphate and potash, salt, sulphur, and titanium.

H. DeWitt Smith, A.I.M.E. president for 1955.

Part of the research is needed on developing methods for making use of lower-grade minerals. The speaker also advocated a "crash" program to develop an economically feasible way to concentrate and remove minerals from sea water and thereby make it useful for irrigation, industrial needs and water supply, and ultimately serving as a means of preventing wars.

Industrial Minerals

Ceramic Materials At the session on ceramic raw materials, papers were presented on bentonite (by Arthur G. Clem, American Colloid Co.), strontium titanate (by Leon Merker, National Lead Co.), "chinastone" (by Oliver Bowen Jr., and Melvin G. Stinson, California Division of Mines), fireclay (by F. G. Mertens, Lacklede-Christy Co.), and staurolite (by C. H. Evans, E. I. du Pont de Nemours & Co.).

Mr. Clem used a colored moving picture to illustrate *Mining and Processing of Bentonite in the Black Hills, S. Dakota.* The movie showed various bentonite deposits, and drilling, stripping, mining and stockpiling operations as well as plant scenes of drying, grinding, packing, etc. Mr. Merker's paper described the synthesis of large crystals of $SrTiO_3$, using the flame fusion technique.

The paper by Messrs. Bowen and Stinson, entitled *Ceramic Raw Materials from Hydrothermally Altered Volcanic Rocks,* described several known deposits of white-colored silicis rocks of this type in California, which are potential sources for high grade chinaware manufacture. He referred to a 400-year old chinaware industry in Japan based largely on "chinastone" deposits, which are similar to those in California. A number of the California deposits are sufficiently large and uniform to be of economic interest, more than 1,000,000 tons having been proved

in a single deposit. The authors described similar deposits in other western and southwestern states.

In the talk on *Diaspore, Flint, and Plastic Fireclay Reserves of Missouri,* F. G. Mertens discussed two of the most important fireclay districts in the world, located about 75 miles west of St. Louis. The North Missouri district has at least 40 years' reserve of plastic fireclay. The South Missouri district has at least a 10 year reserve of diaspore. Both districts combined have at least a 20 year reserve of flint clay.

Staurolite—New Industrial Mineral was described by C. H. Evans. This mineral is a ferrous-iron-aluminum-silicate which gained its name from a Greek word meaning "cross" in reference to its occurrence in cruciform twin crystals. Its only previous use has been the polishing and sale of these crystals for gems. However, the recovery of ilmenite from Florida sands gave auxiliary ore fractions, one of which was rich in staurolite. This paper described the details of its recovery from sand and its use as a raw material in the manufacture of portland cement. (This material is being used by Lehigh Portland Cement Co. at its Bunnell, Fla. plant.)

Mineral Aggregates At the session on mineral aggregates, several interesting papers were presented on sand and gravel, crushed stone, slag, ceramic slag and blasting.

Three talks dealt with the sand and gravel industry in Wisconsin, Illinois, and Indiana, respectively, which were given by members of state geological surveys. In each state the deposits are directly or indirectly of glacial origin. The first paper was given by George F. Hanson, Wisconsin State Geologist, who pointed out that sand and gravel production is an important part of the mineral economy of Wisconsin. In 1952 production exceeded 22½ million tons and was valued at over 15 million dollars; 79 percent was used for paving. Deposits are confined principally to the glaciated portion of the state, he said, but valley trains may extend into the driftless area of the southwest.

The use of local material for highway construction is encouraged by the state, he said. Geological field parties are active in locating sources of aggregate along proposed highway construction projects; the information obtained is made available to contractors and considerable savings on haulage costs are effected.

Reserves are large and no overall shortage is seen, he pointed out. In municipal areas limestone may be preferred as a source of aggregate for large, permanent operations due to either the greater variety of market, greater reserves per unit of surface area or greater uniformity of product.

Several of the speakers on mineral aggregates were (left to right): E. W. Bauman, National Slag Association; J. H. Melvin, Ohio State Geologist; Duncan J. McGregor, Indiana Geological Survey; Nelson Severinghaus, Consolidated Quarries Corp.; J. E. Lamar, Illinois Geological Survey; and Norman Plummer, Kansas Geological Survey.

J. E. Lamar, head of the Industrial Minerals Division, Illinois Geological Survey, in discussing Illinois sand and gravel, pointed out that the last of the great glaciers to reach the state, the Wisconsin glacier, is responsible for the major deposits, which include moraines, outwash plains, and valley trains. The latter are the source of gravel along the Fox, Rock, Illinois, Wabash, Mississippi, and other rivers in the state. The materials making up the valley trains are coarsest in or near the area of the Wisconsin moraines and become finer downstream, so that along Illinois River the material available south of Pekin is largely sand. The same applies to Mississippi River south of St. Louis.

The sand and gravel deposits attributable to the older Illinoisan glacier are generally smaller than those of the Wisconsin glacier and are usually sand and fine to medium-sized gravel.

Mr. Lamar pointed out that the sand and gravel industry is largely concentrated in the north half of the state and is mostly located in outwash-plain or valley-train deposits. The industry consists of plants of a diversity of sizes, including large permanent operations of both dry- and wet-pit types as well as many smaller operations which supply local or temporary demands. Resources are believed to be adequate for a long continuation of the industry at its present level.

In his paper on *Size Distribution and Lithologies of Indiana Gravels,* Duncan McGregor, Indiana Geological Survey, reported that of the 3084 pits from which sand and gravel has been recovered in Indiana, 653 are active or active on demand, and all are in either primary or reworked glacial material.

The speaker discussed a recent survey in which samples were taken from 90 selected localities. Each sample was analyzed to show (1) size distribution (+2″; 2″ to 1″; 1″ to 0.5″; 0.5″ to 0.185″), and (2) lithologic components for the total sample and in each sieve size.

Triangular diagrams were displayed showing quantitatively the percentages of igneous, metamorphic, and sedimentary rocks and the percentages of carbonate, sandstone, and deleterious materials in sedimentary rocks in the total sample and in each sieve size.

Interpretation of the data on the triangular diagrams indicates: (1) Gravels in Indiana consist predominantly of sedimentary rocks. (2) Moraine, kame and esker deposits are apt to be more variable in composition than valley train or outwash plain deposits. (3) Sandstone occurs in larger amounts in moraine and outwash plain deposits than in kames, eskers, and valley train deposits. (4) Deleterious materials increase in the smaller sieve size and such materials also seem to increase south of the Wisconsin glacial boundary and (5) Igneous, metamorphic rocks are more abundant in the larger sieve size.

Most commercial gravels come from valley train and outwash plain deposits, he said.

E. W. Bauman (Managing Director, National Slag Association) gave an illustrated talk entitled *The Blast Furnace Slag Industry of the U.S.* He pointed out that slag has become an important mineral aggregate, with more than 37,000,000

(Continued on page 90.)

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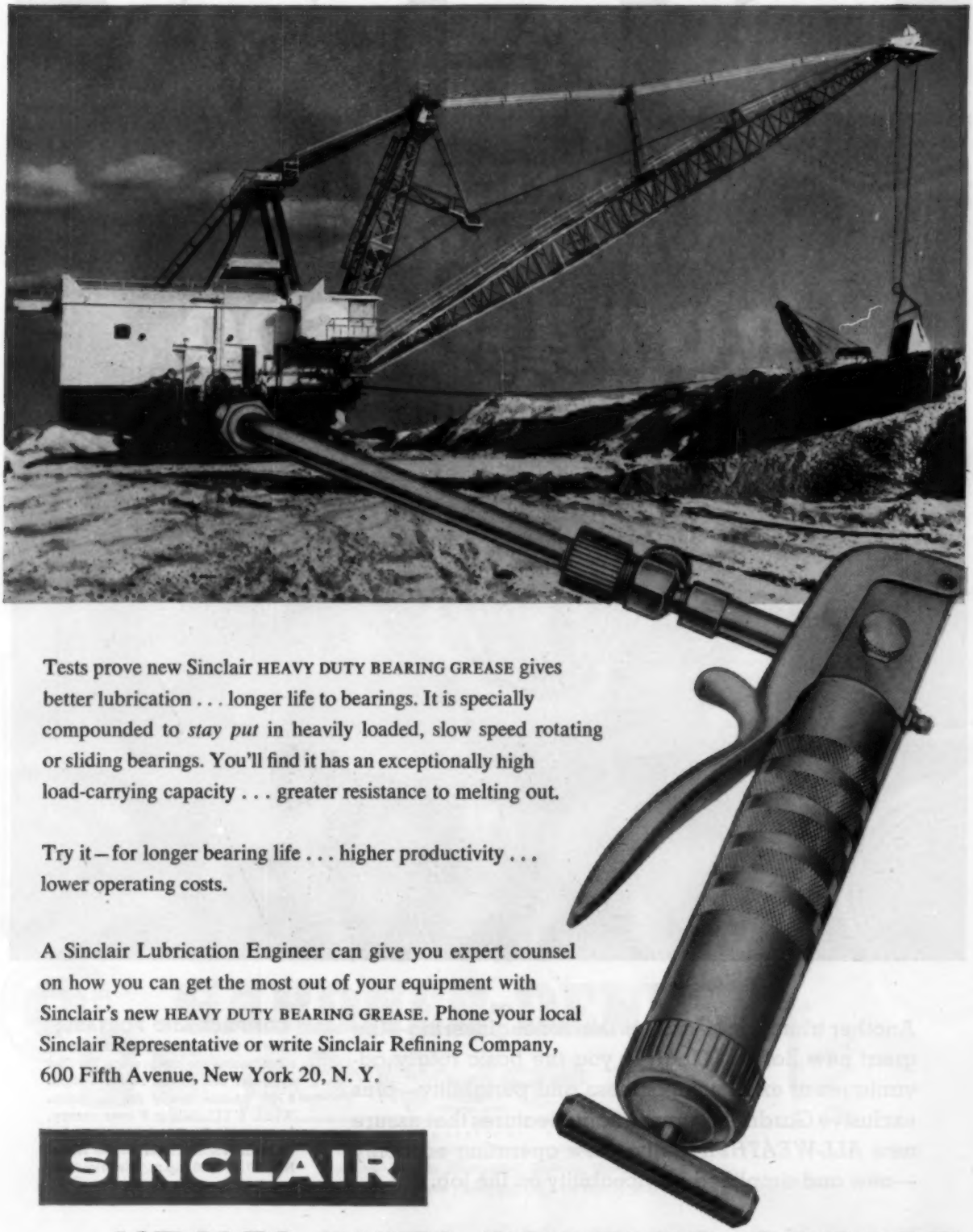

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Check these specifications — two-stage, multivane compressor. Parallel cylinders cast in one block. Weight: 8,700 pounds ready for operation. Width: 5' 11". Height: 8' over canopy. Length: 11' 2". Turning radius: 14'. General Motors Diesel Engine Model No. 6-71—1800 r.p.m. Electric starting. Send now for all the facts.

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* WATER-COOLING assures ALL-WEATHER operation. Exclusive water circulating system maintains constant operating temperature for both compressor and engine—automatically—under all climatic conditions.
* Cold weather engine starting's a cinch. Finger-tip hydro-shift clutch disengages compressor load.
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* Best operating temperature automatically maintained by water-cooled oil system.
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* Economical fuel demand—longer compressor and engine life—are assured by the Thriftmeter—Gardner-Denver's simple, automatic speed control.
* Vibrationless operation saves wear and tear. Compressed air is delivered steadily—without pulsation.
* Air hose and tool life extended by dry, oil-free air from Rotary 600.

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* It takes only *minutes* to remove all compressor vanes for inspection or replacement. No costly compressor let-down time.
* Field maintenance simplified by inspection covers providing access to all vital parts.
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Gardner-Denver Company, Quincy, Illinois

In Canada: Gardner-Denver Company (Canada) Ltd., 14 Curity Ave., Toronto 16, Ont.

A.I.M.E. Convention

(From page 85.)

tons produced (30,500,000 processed) in 1953 (a record year), compared to 13,800,000 tons produced, practically none of which was processed in 1900.

He stated that the technique now employed for processing the material has also improved. The operations for processing slag, with few exceptions, are similar in many respects to that for processing crushed rock.

The principal uses for slag as an aggregate in portland cement concrete, and for asphaltic surfacing, railroad ballast, medium for trickling filter beds, liming materials in the field of agriculture, as aggregate for construction of built-up roofing and as base material, were discussed.

While the present uses for slag will likely hold, he said, there is indication that other applications, when developed, will also make demands on the commodity. Currently some experimentation is done in the use of slag as a raw material for manufacturing glass. The chemical industry may employ increased amounts of slag as a raw material.

D. M. McFarland, Atlas Powder Co., presented a paper on *Developments in the Field of Explosives as Related to the Production of Mineral Aggregates.* The speaker discussed various kinds of explosives, loading, blasting caps, detonating fuse, blasting machines, and millisecond delay blastings.

At the outset he pointed out that developments in the explosives industry are likely to come rather slowly unless unusual conditions hasten a change. For example, the glycerine shortage during World War II was a leading factor causing the increased use of ammonium nitrate explosives at the expense of gelatin dynamite. He also reported that the old theory of the rock breaking quality of an explosive depending entirely on the velocity has undergone modification; thus for certain applications the lower velocity explosives often show superior performance over the high grades. Too fast and too dense explosives may exceed the resistance of the rock formation to disintegration. This so-called disintegration may be evidenced by pronounced pulverization action in a limited zone around the bore hole where a great portion of the energy is expended. As a consequence of new developments, the modern explosives man does not try higher velocity and stronger explosives necessarily when one grade functions poorly; instead he seeks the combination of strength, density, and velocity that shows the most favorable action.

Mr. McFarland also discussed changes in cartridges, some manufacturers using spiral shells, metal cans and extra heavy paper containers which serve both as cartridges and as shipping containers, dome shaped ends for loading horizontal holes, etc. Progress in imparting water resistance to non-gelatinous dynamites of the denser type was also mentioned. The speaker also told of the increased safety and efficiency in blasting caps, electric blasting caps, and delay electric blasting caps. Plastic insulation is now used for wires of most makes of electric caps, which provide water resistance, visibility, etc.

The speaker also discussed the various methods used to accomplish millisecond delay blasting, including the most recent method—millisecond delay connectors inserted in a trunk line of detonating fuse. He reported that the use of timer switches is declining in comparison to the use of millisecond delay caps. The latter method permits alternate firing of holes, progressive alternate firing, and straight progressive firing.

The speaker also discussed the recent use of photographic equipment to record what actually takes place during a blast; it is possible to follow the movement of the face and to look for any premature release of gases. By studying these pictures, changes in the plan of firing may be suggested for future blasts.

In conclusion Mr. McFarland pointed to the strong differences of opinion on the merits of electric blasting *vs.* detonating fuse; these involve top or bottom detonation and progressive or alternate methods of firing. He indicated that the argument can be resolved by experimenting with each method and evaluating the results carefully in order to determine which plan best fits the individual quarry.

In the paper presented by Nelson Severinghaus (Consolidated Quarries Corp., Decatur, Ga.), entitled *Production Problems of the Stone Industry and Needed Research,* the speaker pointed out that production problems are largely those of turning out large tonnages at a cost whereby the stone can be profitably sold in highly competitive markets. For any one plant volume varies greatly with seasons and with construction jobs which are under way within the plant's shipping radius.

Using his own company as an example, the speaker discussed the gamut of problems beginning with overburden removal and ending with loading of the finished product.

In considering drilling and blasting, he pointed out that emphasis must be on overall results, not just the cost of drilling and blasting alone. Thus he said that a 100 percent increase in cost of these two items might be justified if production would be increased by one-third due to better breakage. He said that the choice of size, spacing, and burden of holes for optimum results is a complex one, and that this choice probably affects subsequent capacity and costs more than any other operating factor. His firm's experience in quarrying a massive granite deposit is that best results are obtained by using smaller diameter holes (4-in.) spaced more closely together.

In discussing blasting results, he stated that visual evaluation is not always an accurate measure, since the oversize stone may be buried; consequently he felt that shovel loading rates are probably the best measure and that producers should keep shovel performance records.

With quarry loading and haulage, scheduling and maintenance are big problems. The speaker stressed the importance of quarry haulage being adequate; in fact spare units are good economy. Repairs should be well organized and crews trained to do fast, efficient work. For early detection of cracks and worn parts, particularly on shovels and trucks, he recommended a steam cleaner.

Various phases of the stone plant operation were discussed. Use of water sprays and wetting agents to alleviate dust was taken up. The speaker stressed the importance of using chutes of adequate size and slope to avoid choking. To reduce wear, he recommended the use of stone boxes and abrasive-resistant liners.

The problem of conveyor belt maintenance is largely one of preventing accidental damage and excessive wear due to improper loading, it was pointed out. Good loading means a minimum free fall, direction and velocity close to that of the belt, and load well centered on the belt. Off center loads will cause belts to move sidewise with probable edge damage.

Good performance from crushers depends largely on attention to the following details:

1. Exclusion of dust from bearings and gears by good maintenance of dust seals.
2. Use of the best bearing materials obtainable.

3. Proper lubrication by adequate circulating equipment and change of contaminated lubricant.

4. Maintenance of correct angles between crushing surfaces by replacing dished wearing parts or building them back to proper contour by welding.

5. Keeping bearing clearances low and all bolted joints tight.

Screening and stockpiling were also discussed. One serious problem in the loading out area, he said, is taking care of peak demands without excessive expenditure for spare men and spare machines. The use of reclaiming tunnel belt conveyors is one answer to this problem. In disposing of waste products, he said, it is important to stockpile these separately and where they may be readily recovered, since new markets may eventually open up for these so-called "waste" products.

A broader problem facing producers is the inventorying of supplies and spare parts. The proper procedure will depend largely on local conditions such as relative isolation or availability of parts. The advent of air freight has changed the thinking somewhat on necessary stocks.

Mr. Severinghaus concluded by discussing needed research on both production methods and new uses for stone products. He referred particularly to needed studies on blasting, abrasive-resistant materials, and on the development of lighter and smaller equipment which is easy to transport and erect.

On the subject of product research, the speaker urged studies be made on better methods of sizing and grading and on new uses for waste products, particularly of fines.

A very interesting subject, *The Manufacture and Use of Heavy Fired Clay and Shale Aggregates,* was discussed by Norman Plummer, Kansas Geological Survey. He pointed out that in many areas of Kansas hard durable rock for use as railroad ballast, aggregate, and rip rap is very scarce or not available. Consequently, several years ago a study was made as to the feasibility of producing a durable heavyweight product by burning various clays, shales, or silts, using a method similar to that used in producing lightweight aggregate.[1]

Mr. Plummer discussed rotary kiln pilot tests for manufacturing a ceramic product said to be as durable as conventional aggregates. He described the quality of products made from different types of materials, method of manufacture, and problems involved. For the kiln tests, a 3- by 30-ft. rotary kiln was used. These pilot studies indicated that many of the Kansas shales (particularly the Pennsylvanian, Permian, and Upper Cretaceous) tended to bloat, whereas the Dakota shale (upper Cretaceous) and various Pleistocene loesses were suitable.

Since the original study, there have been attempts to revive this idea. But due to indicated relatively high costs of production, there has been no effort to produce the so-called "ceramic slag" on a commercial basis.

Cement, Lime and Gypsum The first paper at the Cement, Lime, and Gypsum section was presented by Jens C. Holm, Marquette Manufacturing Co., on *Raw Material Preparation at the Brandon, Mississippi Plant.* Mr. Holm described in detail the unusual raw materials used for the production of portland cement at the Brandon plant and the special process and machinery developed to handle these raw materials.[2]

The raw materials are unusual because the quarry deposit consists of layers of very soft, plastic marl of high moisture content interbedded with thin bands of harder marl and hard limestone. On account of this condition, selection quarrying is impossible and the problems to overcome are: (1) to crush and handle the mixture of hard and soft sticky materials; (2) to separate them for further processing in conventional machinery; (3) to do this in such a way that the water content and the chemical composition of the kiln feed can be controlled within the necessary requirements.

As a result of comprehensive tests and design work, the cement firm developed a new primary crusher, which is a single roll crusher with a movable breaker plate with teeth, and a continuous countercurrent washmill of radical new design for the separation of the hard and soft materials. The flow sheet incorporating these machines together with conventional equipment (illustrated herein) results in two products: a minus ½ in. crushed limestone and a minus 20 mesh marl slurry, which are again proportioned together into a two-compartment tube mill producing a desirable kiln feed slurry.

In a paper entitled *Conservation of Lime and Recovery of Lime in Sulphate Pulp Mills,* W. H. Tock, Allis-Chalmers Manufacturing Co., reviewed the recovery of lime in the sulphate pulp industry, discussing in particular the selection and operation of rotary kilns.[3] The pulp industry began installing lime recovery equipment in the 1920's, and today approximately 100 rotary lime recovery kilns are in use in the pulp industry of the U.S. and Canada. These kilns range in size from 6 to 11 ft. in diameter and from 100 to over 300 ft. in length. The installed capacity per kiln ranges from 25 to 200 tons of kiln product per day, and the total daily output is about 7,500 tons. (See table below, which gives typical operating data.)

Mr. Tock reported that most of the kilns installed since 1935 are equipped with heat-recuperating chain sections, and that about 65 percent are so equipped.

He stated that high quality lime can be produced at a uniform rate only if the kiln is fed at a constant rate with lime sludge of uniform composition. In some cases, he said, the feed is a pumpable sludge containing 55-65 percent water. However, in most plants a drum filter or centrifuge is used, which reduces the moisture content to 35-50 percent. In these cases the sludge is fed to the kiln by a screw conveyor.

The speaker also discussed thermal efficiency, sampling techniques, ring formations, proper combustion, control panel, and dust collection.

TYPICAL ROTARY LIME SLUDGE KILN OPERATING DATA

Pulp capacity per day	450 ton
Reburned lime required per ton of pulp	445 pounds
Lime reburned per day	100 ton
Fuel (bunker C oil) per day	6100 gallons
Btu per ton of lime = $\frac{6100 \times 148000}{100}$ = 9,000,000	
Kiln operation	
Output per hour	4.17 ton
Fuel flow per hour	255 gallons
Burning zone temperature	2000 Deg. Fahr.
Exit gas temperature	400 Deg. Fahr.
Draft	
Feed End	0.3 inches
Hood	0.01 inches
Exhaust fan damper	65% open
Kiln speed	0.9 rpm
Moisture in feed	40%
Na_2O in feed (dry basis)	0.75%
CaO in kiln product	90%
Exit gas analysis	
CO_2	27.4
CO	0
O_2	1.6
N_2	71.0
	100.0

[1]The original study was reported in *The Manufacture of Ceramic Railroad Ballast and Constructional Aggregates from Kansas Clays and Silts* by Norman Plummer and William B. Hladik, State Geological Survey of Kansas, Bulletin 76 Part 4 (1948).

[2]This plant was described earlier in PIT AND QUARRY. See Trauffer, Walter E., *Marquette's New Mississippi Plant Designed for Unusual Raw Material,* July 1952, pp. 104-118.

[3]For a similar report by Mr. Tock, see PIT AND QUARRY, June, 1954, p. 121.

Since a paper similar to the one presented by Jules Jenkins, Vibration Measurement Engineers, on *Human Response to Industrial Blasting Vibrations* will appear in our May issue, the reader is referred to this article.

New Thornton Dolomite Plant was the subject of a paper given by Lee Niems, Marblehead Lime Co., Chicago. This dead-burned dolomite plant, located at Thornton, Ill., consists basically of two 9 ft. 6 in. by 250 ft. rotary kilns. This paper discussed several unique features of the plant including a material handling system which enables one man to maintain visual and mechanical control of the raw material feed and finished product of the two kilns (the materials are proportioned near the burner floor rather than at the feed end, as typical in most lime plants); scoop feeders; eddy current coupling kiln drive and feeder drive; and direct contact, counter-flow coolers designed by the author. Mr. Niems showed slides illustrating the various features.[4]

The concluding paper was given by John Pitts, National Gypsum Co., on the subject *Quarry Operation, with Emphasis on Heavy Stripping*. Stripping operations at Fort Dodge, Ia., National City, Mich., and National's new gypsum quarry at Milford, Nova Scotia were discussed. With the increase in depth of overburden, the speaker reported the trend in earthmoving towards larger, more mobile draglines and toward large rubber-tired scraper units.

At Fort Dodge, from 1947 to 1951, tractor-scraper units were used, handling 150,000 cu. yd. per year. In 1949 overburden removal was put on a one shift basis, the following advantages being reported:

(1) Each operator had his own machine and accepted responsibility for its servicing and general condition.

(2) Track and roller life were increased due to closer maintenance possible on a day shift basis. Track life was extended to 3300 hrs. before turning pins and bushings 1800 and 2000 hrs. after turning. Roller seals were saved by each operator, giving life up to an average of 5500 hours.

(3) Cable breakage on scrapers was reduced 50 percent upon elimination of night operation.

In 1952 a twin powered rubber tired scraper was purchased, and in a year's haulage (16 cu. yd. loads)

[4]For further data on the plant, the reader is referred to PIT AND QUARRY, July 1954, pp. 196-201. (Gutschick, Kenneth A.—*Marblehead's Two-Kiln Refractory Dolomite Plant Under Full Production*).

Lee Niems, Marblehead Lime Co., who discussed Marblehead's Thornton refractory dolomite plant.

it handled nearly 200,000 cu. yd. (over an average haul of 2600 ft.). The scrapers used 15½ gal. of fuel per hour. The drive tires (24:00 x 25 and 27:00 x 33) were replaced at 3000 hours for recapping, and the front tires (13:00 x 24) were replaced at 1500 hrs. and put on quarry trucks to finish their life.

The speaker reported that overburden removal can be successfully done in cold weather, but experience has not been good under sub zero conditions—primarily due to breakage and material freezing to the pan. The general practice was to allow an hour for warm-up of equipment not housed indoors.

In Nova Scotia, the overburden was removed with three single engined 15.5 cu. yd. scrapers and one twin-engined 18 cu. yd. unit. The latter unit was not too applicable due to the heavy clay present; however, its real asset was in reducing haulage time in slippery going.

Mr. Pitts stressed the importance of having a heavy duty road patrol for maintaining haulage roads. The roads should have some grade to allow fast runoff of rain water.

Chemical Raw Materials In a well illustrated talk, Byron N. Cooper, geologist, discussed *Industrial Limestones in the Southern Appalachian Region* (Virginia to Alabama). Mr. Cooper described four principal types of high-calcium limestone occurring in this region, each possessing a distinctive range in chemical composition, petrographic features, and physical properties that determine the industrial uses to which each is suited. These four types of limestone are:

(1) dove-gray cryptocrystalline compact limestones with conchoidal fracture, which are low in silica, magnesia, iron, and phosphorus;

(2) light-gray to reddish-brown clastic limestones somewhat variable in composition but relatively high in phosphorus, devoid of regular bedding but cross-laminated, abounding in stylolites, bearing unmistakable signs of having been deposited by marine currents;

(3) white to light-gray limestones, variable in texture, exceedingly low in silica and magnesia, but moderately high in phosphorus, occurring in localized reef-like ridges that interfinger with impure strata;

(4) white to brownish-gray oolitic limestones of clastic origin.

The premium grade of high-calcium limestone occurring in the southern Appalachian region, Mr. Cooper said, is the dove-gray cryptocrystalline type, which is characterized by insets or "eyes" of calcite rhombs. The thickest bodies of high-calcium limestone occur in localized reefy accumulations. He discussed in detail deposits of each type.

A second paper on industrial limestones (and dolomites) in the Midwest was discussed by two Pit and Quarry staff members—Kenneth A. Gutschick and John Peter Flynn; their paper reported the findings of a recent comprehensive survey made of limestone producers in the 9-state area of the Midwest (particularly those producers of high quality limestone and dolomite used for chemical and metallurgical purposes). The distribution of the industry and factors affecting the distribution pattern, including geology, markets, and transportation, were discussed.

The importance of the Midwest in limestone production is indicated by the following facts: in 1951, 52 percent of the U. S. limestone output, 59 percent of the U. S. fluxstone output, 47 percent of the U. S. limestone for miscellaneous purposes (largely chemical uses), and 55 percent of the U. S. open-market lime output were accounted for by the Midwest. Leading industrial limestone states were Michigan, Ohio, Illinois, and Missouri, with northern Michigan and northwestern Ohio standing out as major districts—the former particularly for flux and chemical stone and the latter for lime and refractory dolomite. Other major centers are the Chicago and St. Louis districts. The Great Lakes stand out as major arteries of industrial limestone flow, handling nearly one-half of the industrial limestone marketed in the Midwest.

Based upon the projected growth in the Midwest of the steel and chemical industries—which are the biggest customers of industrial lime-

stone, and construction—a major lime consumer, the prospects for the continued expansion of the Midwestern industrial limestone industry are excellent, it was reported. The projected increase in demand for basic raw materials will cause a rapid depletion of the high quality limestones and dolomite deposits; however, for the Midwest, there is apparently no immediate cause for alarm.

Shortages that will occur in certain localized centers of production will be offset by development of new deposits. Several geological formations located throughout parts of the Midwest can be tapped for future supplies. However, many of these deposits may not be as choice as present workings, but improved quarrying and processing methods will tend to offset this drawback. Development of even more efficient earthmoving equipment will enable heavier overburden to be tackled. Selective quarrying on the one hand and beneficiation methods (through froth flotation and heavy media separation) on the other hand should come to the forefront as means of upgrading poorer quality stone. Increase in underground mining, particularly in hilly areas, will also alleviate the supply problem.

Changes in the plant distribution pattern and hence flow patterns are likewise expected. Increase in importance of the northern Michigan and Ontario limestone centers is expected, judging from the new steel company developments in those areas. This will mean even greater emphasis on Great Lakes transportation. The decentralization of heavy industry, and the shift westward, will undoubtedly place more importance on limestone centers in Missouri, and perhaps Iowa and Kansas.

Rare Earth Minerals in Industry were discussed by Frank D. Lamb, U. S. Bureau of Mines. The commercial sources of rare-earth metals are monazite, a rare-earth phosphate, and bastnaesite, a rare-earth fluocarbonate. Since 1950 relatively large reserves of both these minerals have been developed in the United States, thus reducing our dependence upon foreign supply sources. In fact, all of our present needs for rare-earth metals can now be obtained from domestic ores. Monazite is now being produced from alluvial deposits in Idaho, South Carolina, and Florida. Bastnaesite has been produced in California since 1952.

Byron C. Elsley, Baroid Division, National Lead Company, presented a paper entitled *The Barite Industry.*

Jules Jenkins, Vibration Measurement Engineers, who discussed "Human Response to Industrial Blasting Vibrations".

In it he presented some interesting facts relating to this up-and-coming mineral.

Barite's most important property is its weight, a specific gravity of 4.5, and the fact that it is the only important known source of the element barium and its various compounds.

Mr. Elsley pointed out that barite is widespread, being found in almost every country. The first use of barite in the United States was as a paint filler; but at present there are, broadly speaking, two markets: (1) ground barite for drilling and various minor uses, and (2) crude, or unground, principally for the production of lithopone and barium chemicals. The United States mines about 4 percent, and processes and consumes about 54 percent of the world production.

Domestic demand is concentrated along the Gulf Coast and California for the oil well drilling industry and in the Great Lakes area and Atlantic seaboard for the chemical industry. Arkansas, Missouri, and Nevada are the chief domestic sources. The speaker noted that no new processing developments have occurred in recent years.

Mr. Elsley believes the most noteworthy new development in the industry, in spite of the prevailing high tariff, is the strong trend towards importation of high grade foreign crude barite for dry grinding in five new plants located at Gulf Coast ports, the heart of a major market area. A young Nova Scotia producer now has the greatest output of any single operation in the world. There is increased interest in the Yugoslav, Peruvian, and Mexican sources due to the shifting tide of economics.

Fillers, Fibers, and Pigments *Fuller's Earth Industry in the Florida-Georgia District* was presented by James L. Calver, Florida Geological Survey. According to the speaker, the earliest discovery, in the United States, of clay that was suitable for fuller's earth was made in 1893 at Quincy, Gadsden County, Florida. Since 1895, these clays of middle Miocene age have been mined and processed at Quincy and in other localities in Gadsden County, as well as in Decatur County, Georgia. The Florida-Georgia fuller's earth district in 1941 produced 44 percent of the quantity and 51 percent of the value of the fuller's earth mined in the U.S. In 1952, the district produced 64 percent of the quantity and 70 percent of the value of fuller's earth mined in the U.S.

From the beginning of mining in 1895 until 1942 nearly all of the fuller's earth produced was consumed in filtering and decolorizing mineral and vegetable oils. Since 1942 new uses for these clays include rotary-drilling muds, absorbents for oily floors, carriers for insecticides and fungicides, catalysts and fillers.

L. R. Blair, Johns-Manville Co., gave a paper on *Pigments—A General Survey with Special Reference to Titania.* The properties which a substance must have to qualify as a good pigment material were discussed, the most important being a high index of refraction, proper color and proper particle size range. These properties which are inherent in commercially produced titanium dioxide, make the compound an excellent pigment.

A New Use for Barytes was given by Walter F. Winters, Rubarite Inc. He described the use and manufacture of an asphalt rubberizer consisting of barytes and latex rubber. The principle of flocculating a barytes slurry and coagulating a rubber latex simultaneously, is applied in the manufacture of this material, with some very interesting results.

Ball Clay Mining in the United States was discussed by Richard Bell, Bell Clay Mining Co. This paper gave a brief outline of the geology and exploration methods followed by a detailed description of stripping operations and mining methods. Also handling of the raw materials into storage and from storage for subsequent loading, equipment employed, and final processing of the raw materials including pulverizing and drying were described.

C. G. Albert, Minerals and Chem-

(Continued on page 134.)

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Most of the better sand and gravel pits are exhausted—those now being used contain more clay which must be eliminated. Many states now require that crushed stone be scrubbed before screening to eliminate soft stone, clay and dirt. This demands a better scrubber—one which will eliminate large amounts of clay with a minimum of expense for installation, water, power, and up-keep. Telsmith's answer is the Super-Scrubber—proven successful in many of the toughest pits and quarries.

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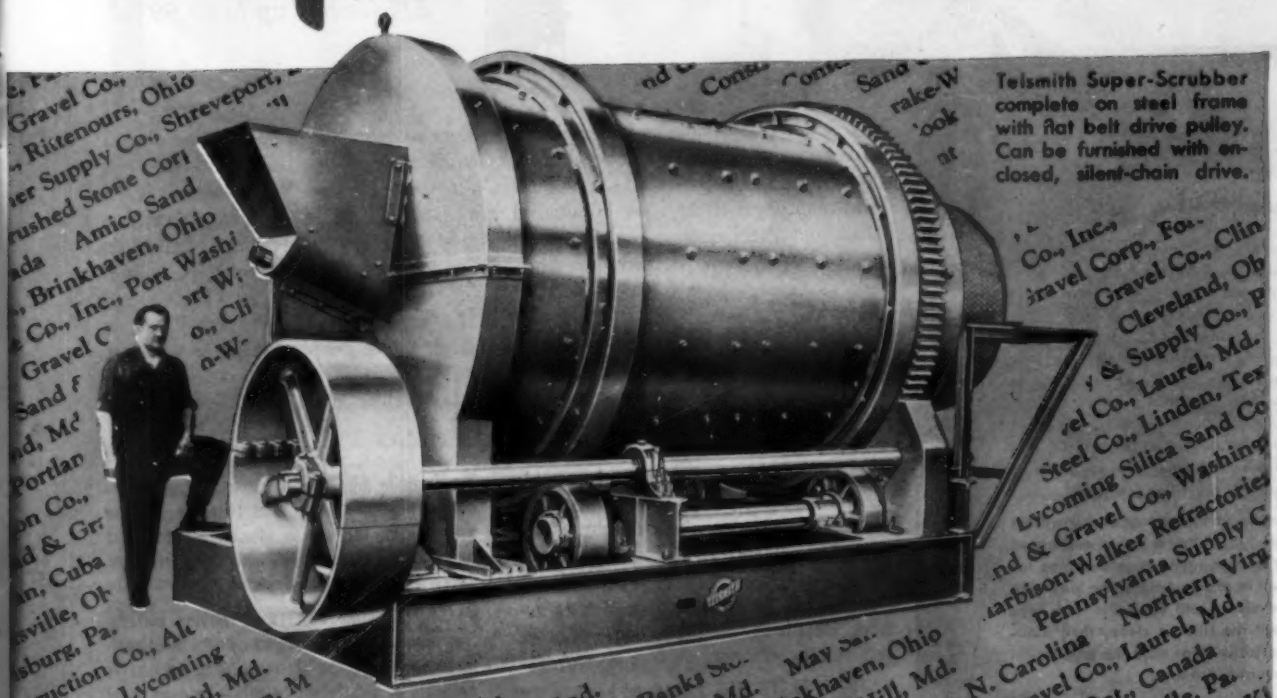

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Here's the heart of the DUALAIRE principle. Gas enters through top of filter tube (A). Dust is filtered out along length of filter surface and as it begins to build up (B), the slight change in differential pressure causes the reverse-jet blow ring to go into operation. This ring fits tightly around the filter tube and concentrates a jet of air (C) that blows from the outside inwardly through the filter fabric (D).

As the ring moves up and down the tube, the fabric is flexed and blown at the same time, thus loosening the dust in small portions. The blow ring travels up and down the filter tube until the filter is clean, then automatically stops until the tube again requires cleaning.

Cleaning action is uniform and steady. There are no sudden pressure surges as filter surface is cleaned — no destructive rapping or jarring operations to shorten life of filter element — no wide variations in gas flow or plant efficiency!

If you use bag-houses or other similar collecting systems in your plant operations, be sure to investigate the *many* vital advantages built into Western Precipitation's new DUALAIRE Dust Collectors. Backed by the same well-known organization that pioneered commercial application of COTTRELL Electrical Precipitators and MULTICLONE Mechanical Collectors, DUALAIRES bring entirely new performance and efficiency standards to filter-type collection systems.

As outlined at the left, heart of the DUALAIRE is a reverse-jet blow ring that travels up and down the cloth filter tube, keeping it clean without the alternate choking and pressure surges characteristic of conventional rapping, vibrating, or jarring systems of cleaning off the collected dust. *Result—*

▶ **UNIFORMLY LOW PRESSURE DROP** is assured, because the collected dust is removed steadily and in small increments — not by sudden surges!

▶ **UNIFORMLY HIGH EFFICIENCIES** — as high as 99.99% under actual field conditions — are maintained by the constantly-cleaned filter surfaces. There is no "choking" action — no variation in filter efficiency as dust accumulates!

▶ **LONGER FILTER LIFE** is obtained because the filter fabric is not subjected to destructive jarring, rapping and vibration of conventional filter cleaning methods. The Dualaire cleaning action is gentle — yet far more effective!

▶ **LESS EQUIPMENT IS REQUIRED** to handle a given capacity with the Dualaire because no standby sections need be provided for gas cleaning while other sections are shut off for rapping. The Dualaire filter is kept constantly clean — automatically — while it is filtering out the suspensions. The gas is filtered and the dust removed simultaneously — without interruption. Saves space, simplifies installation!

▶ **MAXIMUM ADAPTABILITY** to varying installation requirements is assured by the "sectionalized" design of the Dualaire. Each section is available in 5 different heights — and as many sections can be bolted together as desired to meet plant requirements. As needs increase, simply add more sections!

▶ **EFFICIENT STRAIGHT-THRU DESIGN** of filter tubes assures easier dust recovery, better flow. Dirty gas enters top of tube, is filtered through the walls, and dust drops by gravity through bottom of tube into collection chamber. Separated material does not re-entrain in the gas flow.

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There are many other advantages built into the DUALAIRE. *For further details send for this descriptive 12 page booklet. Or contact your nearest Western Precipitation representative!*

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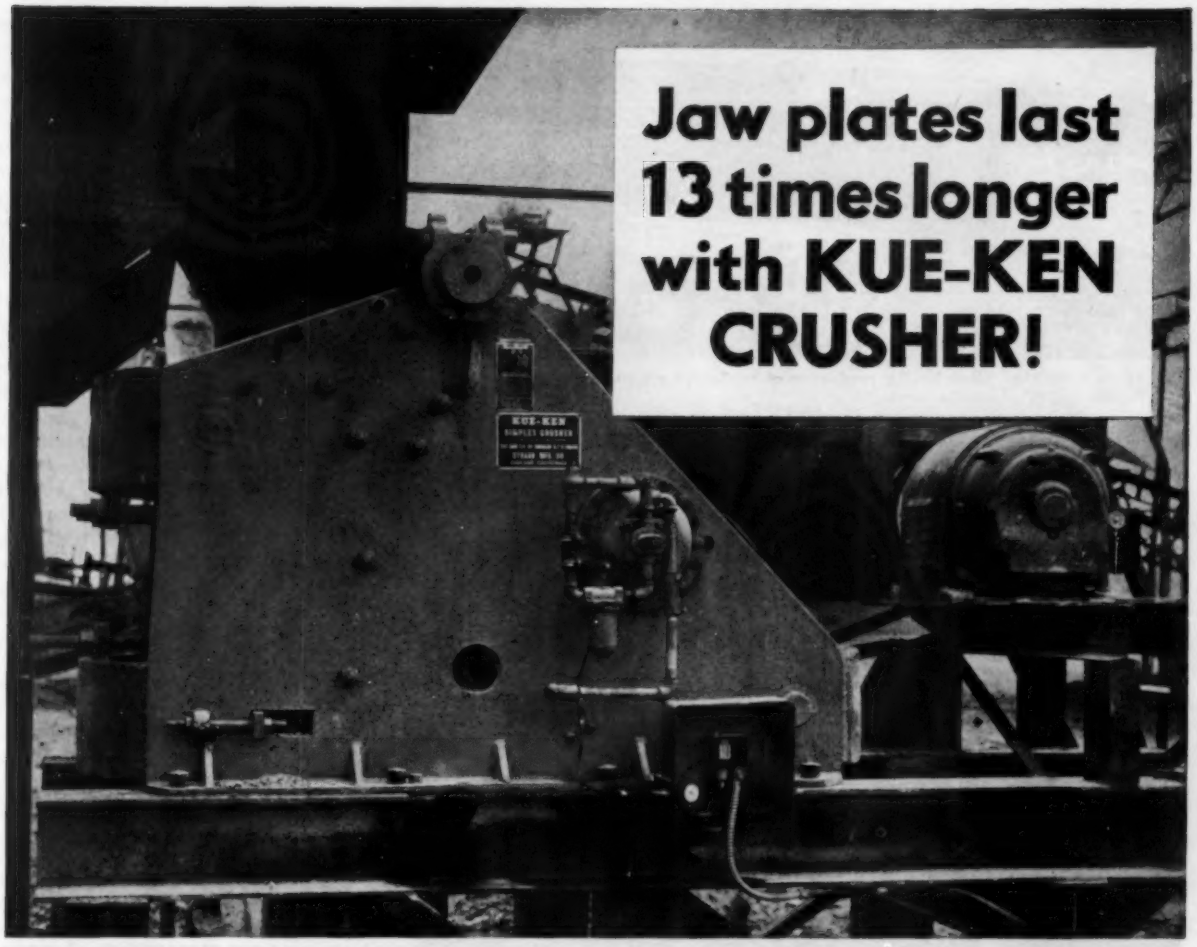
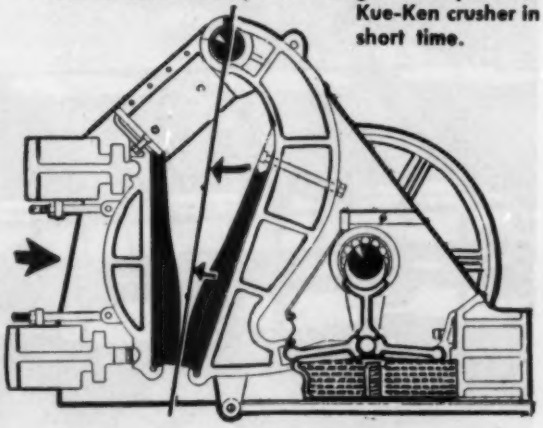


Jaw plates last 13 times longer with KUE-KEN CRUSHER!

"Crushing without rubbing" principle of Kue-Ken Crusher substantially reduces the main cause of jaw plate wear. Kue-Ken uses less power and operates faster at 375 rpm for 25% to 50% more capacity and a more cubical product. Kue-Ken is the lowest priced crusher per ton capacity. Overload cannot damage Kue-Ken . . . safety device instantly releases flywheel. No broken flywheels or bent shafts — no broken frames or toggles — no burnt out belts or motors!

Jaw plates last 13 months on this 36" x 10" Kue-Ken at gravel company, Tracy, California, compared to 1 month with previous overhead eccentric crushers. Jaw plate savings alone paid for Kue-Ken crusher in short time.



In "crushing without rubbing", see how the Kue-Ken hinge pin is located on the center line of the crushing zone. The jaw moves in an almost straight line. Rock is instantly gripped and crushed without rubbing.

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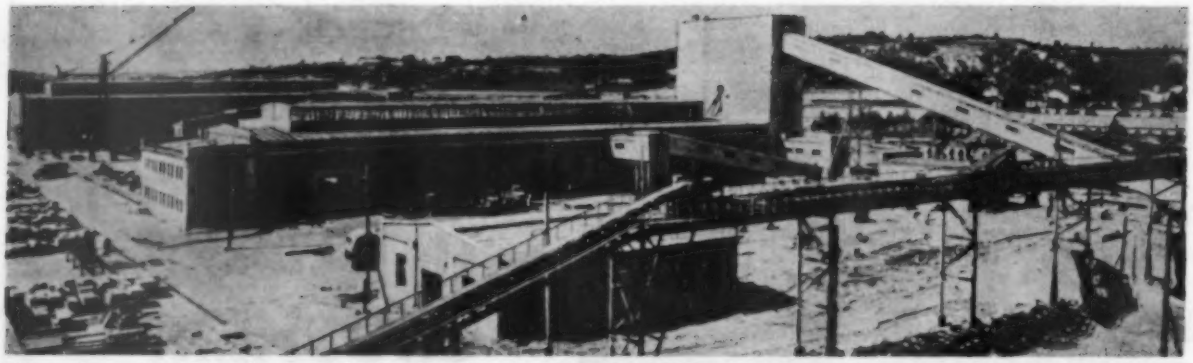
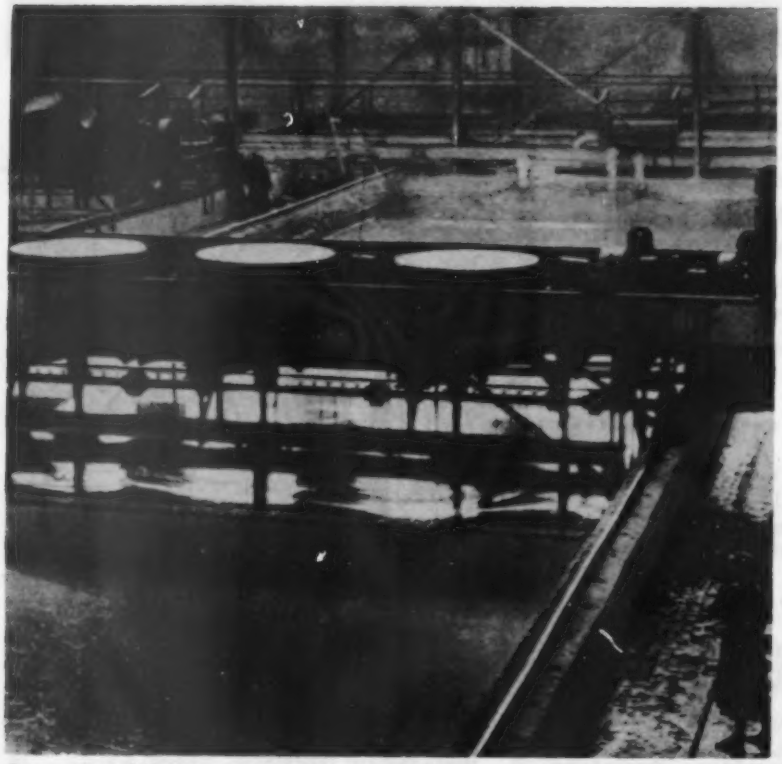


This nearly completed plant for the production of reinforced concrete sections at Kiev, capital of the Ukraine, will have an annual output of 1,765,000 cu. ft. of various items.

Problems and Shortcomings In the Nonmetallic Mineral Industries of Russia



One section of the raw materials shop at Russia's Belgorod cement plant. In these tanks, or silt ponds, each holding about 124,000 cu. ft., the raw material mass is thoroughly mixed by devices attached to bridge cranes.

RUSSIA has demanded quick elimination of serious deficiencies in its stone products industries and has emphasized the need for full mobilization of pit-and-quarry capacities to meet sharply-increased concrete production goals.

At present, the Soviet press admits, the U.S.S.R. "is experiencing an acute shortage of stone products despite tremendous supplies of nonmetallic minerals in almost all regions and despite huge investments made in processing facilities." It adds that "this deplorable situation is due primarily to major shortcomings in the industry and to intolerably poor management at many quarries."

This Russian "self-criticism"—which goes on continually in all branches of Soviet industry—by no means indicates a breakdown in production of nonmetallic minerals. It does, however, reveal widespread inefficiency resulting from thorough bureaucratization of pit-and-quarry enterprises and denotes failure to meet many of the Kremlin's lofty goals.

From the standpoint of tonnage, there is little doubt that Russian output of such items as cement, sand, gravel, crushed stone, phosphate, potassium salts, native sulphur and asbestos is far above pre-war levels. And production seems certain to continue rising, even though the pace is not as fast as the government would like.

The official Communist party newspaper *Pravda* stated recently that the slow progress of the U.S.S.R. Ministry of the Building Materials Industry in organizing and properly developing the stone products industry has forced other ministries,

agencies, and even individual construction projects to meet their needs by haphazardly opening their own quarries.

It was stated that "about 88 percent of the existing quarrying enterprises operate without a surveyed and tested raw material base. As a result long-range planning is impossible. The fact that over 30 ministries and agencies, in addition to many intermediate administrative organizations, are now engaged in extracting and producing these building materials also shows that matters are being handled badly."

Pravda charges that lack of coordination and intelligent planning in allocating quarries has created a situation in which some provinces have such surpluses of rock products that the railroads are unable to keep up with hauling demands. Even so, new quarries are being opened in these areas. In other provinces equally rich in nonmetallic mineral deposits the quarrying industry is so poorly developed that materials which should be available locally must be brought in from great distances at high cost.

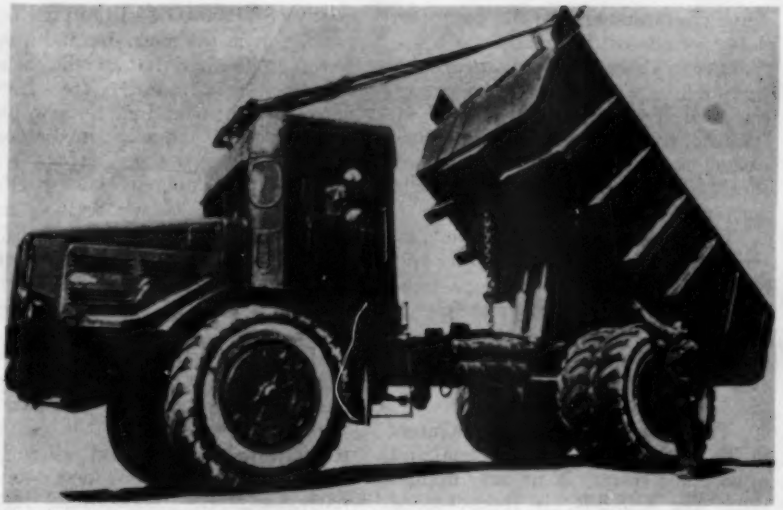
Annual reports issued by various ministries and agencies showed that in 1953 alone the price of rock building materials increased 43 percent or almost two billion rubles ($500,000,000 at the inflated rate of exchange), largely because of transportation costs.

New areas of booming construction activity, such as western and eastern Siberia, the Far East, and Kazakhstan have not been surveyed for raw material reserves useful in expanding the stone products industry, *Pravda* complained. Even worse, the problem of providing normal supplies of these materials in well-developed western areas of the U.S.S.R.—including the Belorussian, Lithuanian and Ukrainian republics—still has not been solved.

A shortage of crushed rock which is almost universal in Russia has had serious effects on the transportation system. In many parts of the nation foundation material for highways and railroads is limited to sand or river gravel, and natural dirt roads still predominate.

Pravda estimated that in 1954 alone interprovince rock products shipments—"most of which were uneconomical and irrational"—totaled 20,000,000 cubic meters (26,160,000 cu. yd.), for which 1,500,000 freight cars were required.

"Kaluga province is a typical example of backwardness in the production and shipment of stone products," *Pravda* points out. "It has 21 quarrying enterprises belonging to nine different ministries and agencies. Although hundreds of thousands of cubic meters of stone and crushed rock are shipped outside the province each year, the province center itself—Kaluga—still suffers an acute shortage of these products.



This electrically-operated 25-ton "trolley" dump truck is connected with overhead power lines by twin poles mounted on a reinforced driver's cab. The Russians claim that the novel vehicle has great possibilities as a heavy-duty sand-and-gravel hauler.

"Eight or ten organizations frequently work the same deposit. This fragmentation of operations leads to uneconomical use of rock products and a waste of funds through huge, unproductive expenditures. Cost of the extracted materials varies sharply: stone from 23 to 47 rubles ($5.75 to $11.75) a cubic meter, crushed rock from 29 to 82 rubles ($7.25 to $20.50) a cubic meter, gravel from 15 to 50 rubles ($3.75 to $12.50) a cubic meter, and sand from three to 20 rubles (75 cents to $5) a cubic meter."

In general, the Russians figure that when the capacity of a quarry is increased to 300,000 to 500,000 cubic meters annually, the cost of materials should be half as much as the cost at quarries with capacities of 100,000 cubic meters or less. At the same time, labor productivity in the larger quarries is expected to be five or six times higher as a result of increased mechanization.

However, *Pravda* concedes that more than 70 percent of Russia's quarries are small enterprises with annual capacities of up to 50,000 cubic meters each. Stripping work at these small quarries is only 25 to 50 percent mechanized, and extraction work is 15 to 20 percent mechanized.

"As a direct consequence," says *Pravda*, "55 percent of all workers in the rock products industry are employed in small quarries which account for only 20 percent of total output. At the same time, quarries with a production capacity of more than 200,000 cubic meters annually, which provided 47 percent of the materials in 1953, required only 15 percent of the workers employed in the rock products industry."

Pravda also admitted that there is an acute shortage of rock excavators having bucket capacities of one to two cubic meters, "with the result that such labor-consuming operations as stone extraction are mechanized only 30 to 40 percent even at the larger quarries. No high-capacity, narrow-gauge cars or large screening machines are being produced, and far from enough diesel and electric locomotives for narrow-gauge railroads are being built.

"It is high time for the Ministry of Construction Machinery and Road Machine Building to concern itself with furnishing necessary equipment for quarrying," *Pravda* warned.

One result of the quarry freight car and engine shortage mentioned by *Pravda* has been development of an electrically-operated 25-ton dump truck that runs like a municipal trolley bus. The Russians claim that the novel vehicle, which has twin poles that are mounted on a reinforced driver's cab and connected with overhead power lines, offers great practical possibilities as a heavy-duty sand and gravel hauler.

Since the vehicle's route from quarry to delivery point would, in

some circumstances, be the same for long periods of time, only one comparatively-short set of overhead power lines would have to be strung in each direction. A large fleet of electric trucks could use the same wires, and installation costs would be small if distributed over millions of ton-miles of hauling.

The Soviet press says that the electric dump truck is easier to build and simpler to operate than gasoline-powered models. Even more important, there would be a considerable saving in liquid fuels which the U.S.S.R. prefers to use for military and other "vital" purposes.

The need for more rock excavators with bucket capacities of one and two cubic meters in no way implies that the U.S.S.R. is incapable of building them. One reason for the shortage is that Soviet machine-building factories show an illogical tendency to concentrate on large-size machinery, even when the greatest need is for smaller models.

The Stalin Heavy Machine Building Plant at Novo Kramatorsk, for example, has just developed the 1,000-ton EGL-15 electric crawler shovel for use in open-cut coal mines at a time when smaller shovels are still in short supply. The EGL-15 has a bucket capacity of 15 cubic meters, is actuated by 44 electric motors, and moves on four pairs of crawler treads, each of which is about 20 ft. long and over 3 ft. wide. Rated capacity of the EGL-15 is 16,000 to 18,000 cubic meters of earth in 24 hours. Even larger shovels are being developed by Soviet industry in its attempt to produce the world's largest excavating machinery.

Another problem pointed up by *Pravda* is the need for ending the "terrible muddle" with regard to labor and wages. At present, *Pravda* declared, almost every quarrying enterprise has its own norms and pay scales.

"There are sharp inequalities in payment even for the same job at the same pit worked by various ministries and agencies. High labor turnover results. Proper amalgamation of quarrying organizations working the same deposit would permit the freeing of 15,000 workers and many administrative personnel for other jobs, besides doubling labor productivity and saving more than 240,000,000 rubles ($60,000,000) annually."

According to *Pravda,* estimates have been made that the Soviet government suffers an overall loss of more than 3,000,000,000 rubles annually ($750,000,000) from poor organization in the quarrying industry. It was emphasized that an efficiently-organized rock industry, free from narrow departmental interests, would permit a sharp reduction in the cost of capital construction.

Except for concrete, few specific figures are available on Russia's annual output of nonmetallic minerals. Soviet production statistics are usually expressed in terms of percentage gains from an undisclosed base figure.

However, recent economic studies by United States Government agencies give these post-war estimates: phosphate rock, 2,500,000 metric tons annually; potassium salts (22 percent KCl), 2,000,000 metric tons; native sulphur, 100,000 long tons; and asbestos, 157,000 metric tons.

Russia is known to be achieving a steady increase in phosphate and potassium salts production. The upward trend should continue indefinitely, since the U.S.S.R. is believed to have the world's largest reserves of potassium salts and of apatite—a source of phosphate.

Apatite ore deposits located north of the Arctic Circle in the Khibin Mountains of the Kola Peninsula have been estimated at 2,000,000,000 tons. Russia's reserves of potassium salts have been placed at 15,000,000,000 tons, and those for magnesium salts at 18,000,000,000 tons.

Soviet cement output has risen impressively during the postwar period and is slated to continue its rapid expansion. In 1940 the U.S.S.R. produced only 5,000,000 metric tons of cement. This figure rose to 10,400,000 metric tons in 1950, to 12,400,000 metric tons in 1951, to 14,300,000 metric tons in 1952, to 16,400,000 metric tons in 1953, and to 19,500,000 metric tons in 1954. The goal for 1955 is 22,900,000 metric tons.

Russia's percentage gain in cement output since 1940 has outstripped increases shown for all other basic industrial items, including electric power, coal, petroleum, pig iron and steel.

The recent Soviet decision to switch back to emphasis on heavy industry means even higher demand for concrete used in factory construction. Government plans also call for further expansion of housing and highway programs.

Late last year the U.S.S.R. Council of Ministers and the Central Committee of the Communist Party issued a far-reaching decree requiring construction organizations to use reinforced concrete wherever possible to replace metal and wood. One part of the decree declared: "Design organizations of ministries and departments must not permit use of metal structural parts if they can be replaced by reinforced concrete. Use of metal structural parts for certain types of buildings and installations is to be forbidden after dates specified in a separately-adopted order."

Starting this year, for example, use of metal frames, beams, and girders in floor, ceiling, and roof designs for new apartment houses and "cultural-service," buildings will be banned. By 1957 the ban will extend to the use of wooden floors and ceilings in the design and construction of new apartment buildings of four or more stories, cultural-service buildings of three or more stories, and two-story children's institutions.

Overall production of reinforced concrete structural parts is slated to increase from 1,860,000 cubic meters in 1954 to 3,515,000 cubic meters in 1955, 6,085,000 cubic meters in 1956, and 9,790,000 cubic meters in 1957.

N. S. Khrushchev, now widely regarded as Russia's top man, is spearheading the drive for wider use of reinforced concrete in construction. He said that "in connection with the five-fold increase in output of precast reinforced concrete during the next three years the output of both cement and inert materials must be raised more than 50 percent." This would mean overall Russian cement output of about 30,000,000 metric tons in 1957.

Khrushchev also gave an unqualified endorsement to concrete roads as opposed to black top. In a recent speech before an all-union builders conference he declared: "We need to develop the construction of concrete roads. These are the very best roads. An asphalt road is a ten-year road, but a concrete road lasts 100 years.

"We must turn toward development of the cement industry with a view toward building more concrete roads. As the saying goes, we are not so rich that we can afford to build cheaply."

American Bitumuls & Asphalt Company, San Francisco, Calif., a subsidiary of Standard Oil Company, has announced the start of construction on a new asphalt distribution terminal at Springdale, Penn., near Pittsburgh. The new terminal will have a capacity of 80,000 bbl. or 3,360,000 gals.

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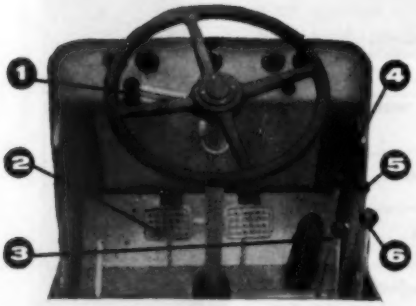

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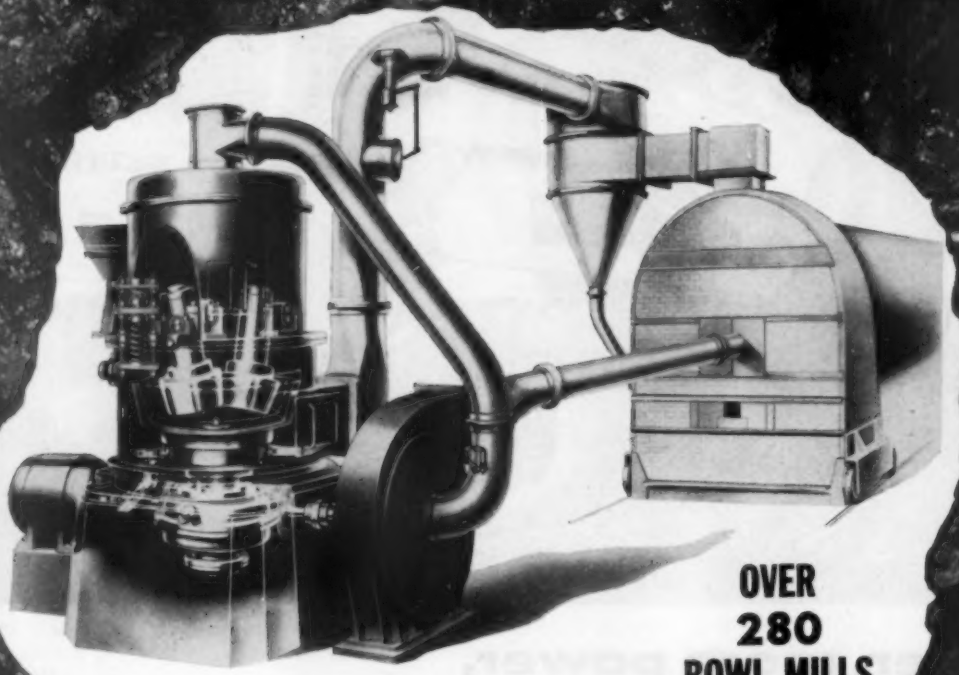

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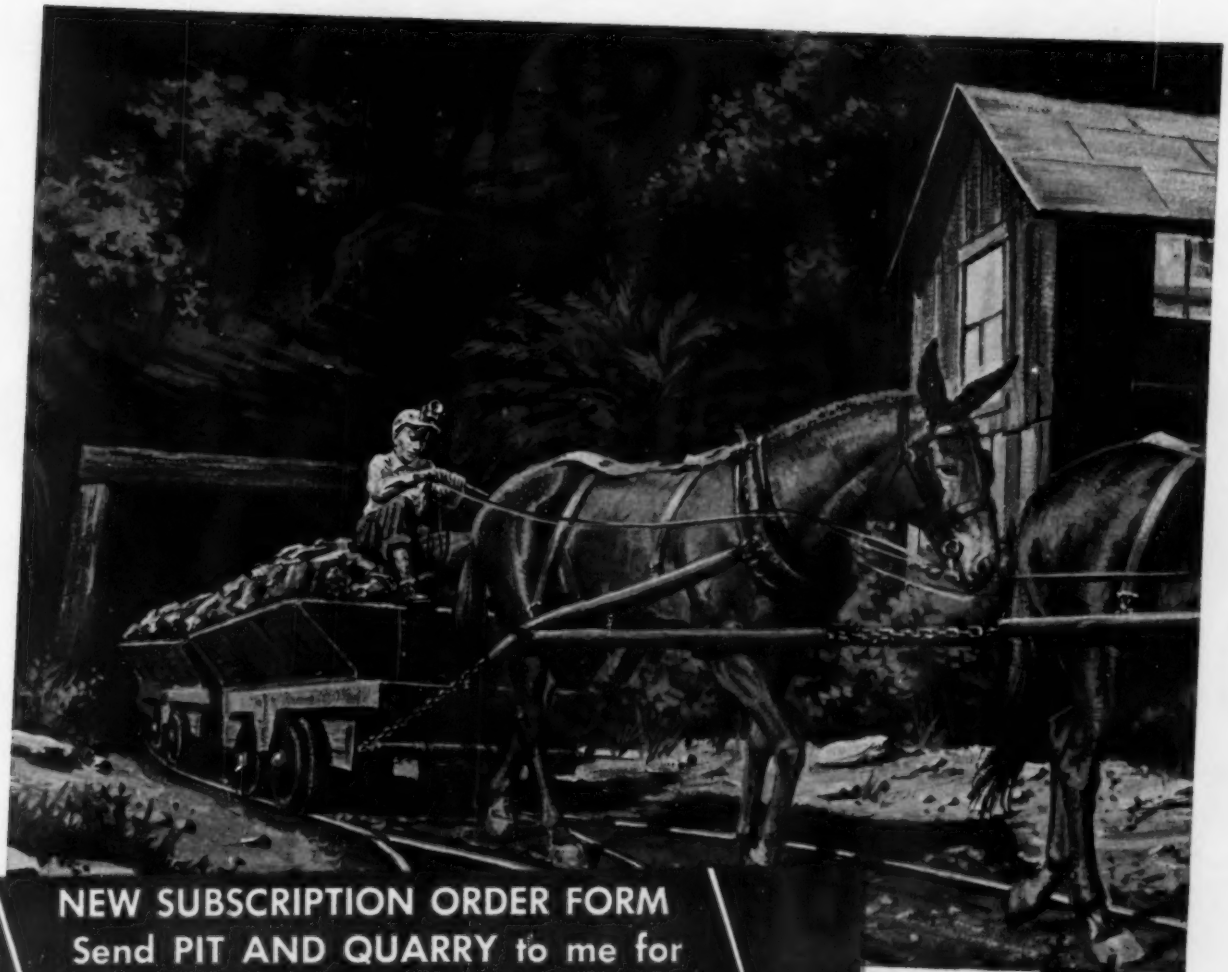

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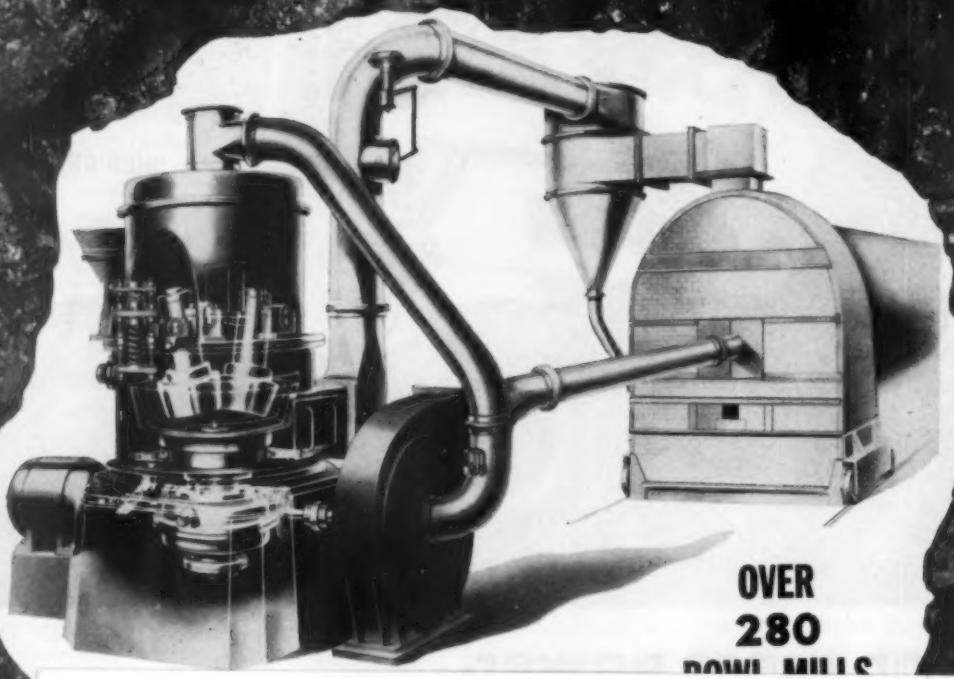

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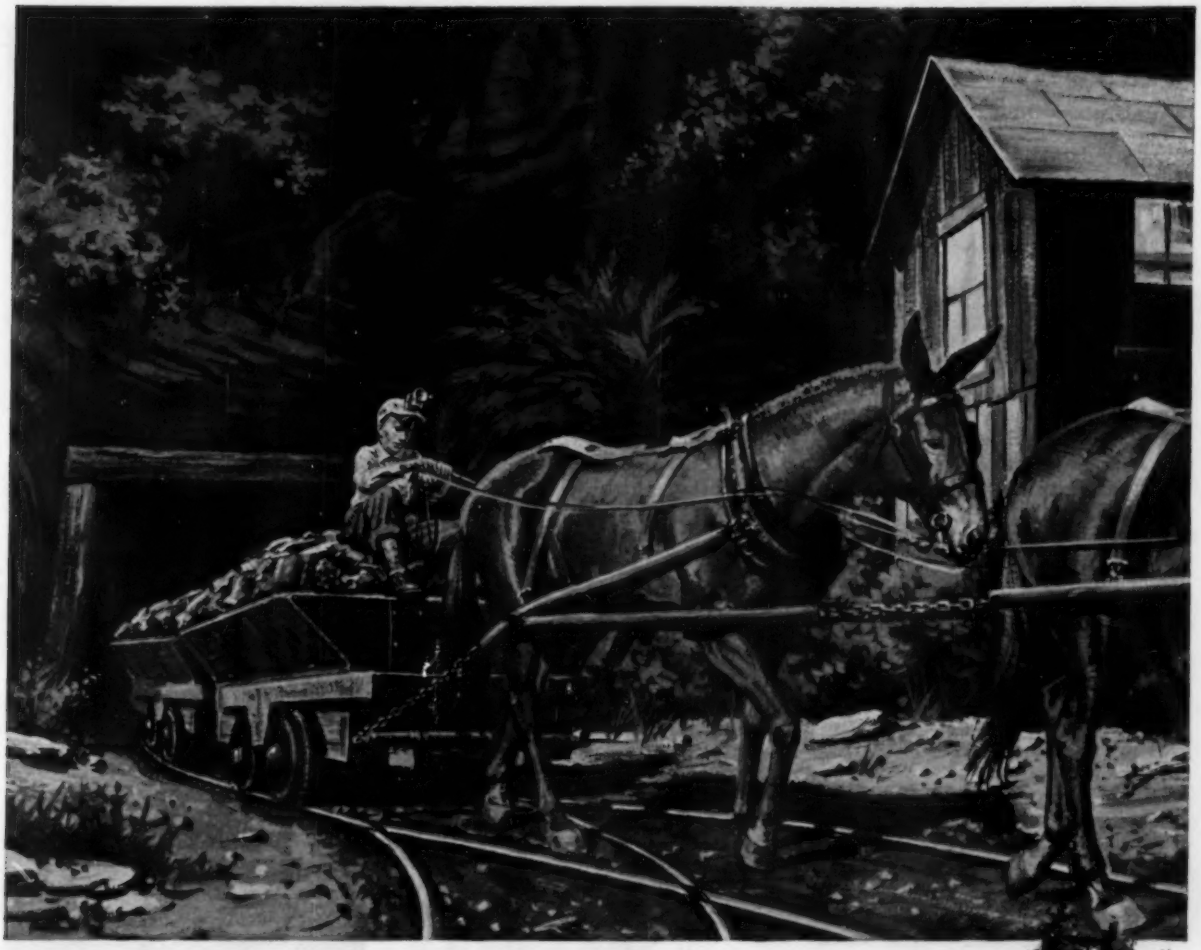

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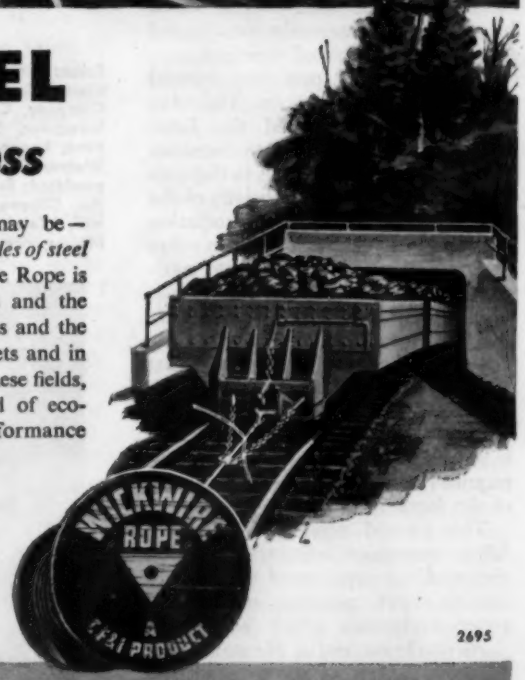

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Iowa Agstone Producers Meet in 10th Annual Convention

THE tenth annual convention of the Iowa Agricultural Limestone Association was held at the Savery Hotel, Des Moines, Iowa, on February 23 and 24, with a record attendance of over 200 persons. The board of directors and members of the nominating, resolutions, and auditing committees held their annual pre-convention meeting-luncheon on February 23. That same afternoon these committees held their respective meetings and prepared reports, which were presented during the general meeting-business session the following day.

A reception, sponsored by the 50 associate members of the association, was given the members on Wednesday evening, February 23. The same hosts also sponsored the Thursday evening reception, the annual buffet dinner, and the ball, events which have become pleasantly anticipated features of the annual meetings.

Melvin E. Raid, president, opened the business meeting on Thursday morning and welcomed the limestone producers, associate member representatives, and guests to the convention. Mr. Raid spoke briefly of the work carried on by the association over the last year with the two other groups interested in the state agricultural soil conservation program—the Iowa State College and the Iowa A.S.C. Committee. He said that the objective of these agencies, like that of the association, is to sell the additional 3,000,000 tons per year of agricultural limestone—a material which is second to none for the purpose—required to maintain the level of need of the farmers of Iowa.

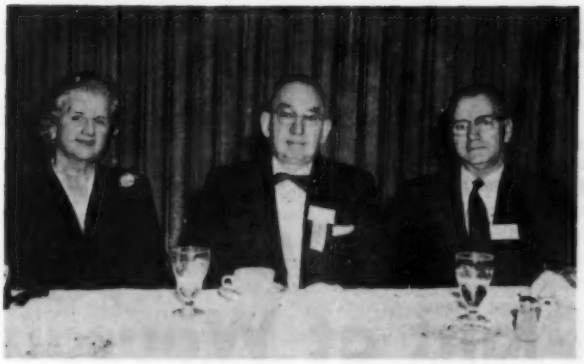
The annual report of Clint A. Allen, executive secretary-treasurer, reviewed the progress of the association in 1954, pointing out several group endeavors which have been particularly successful. He stated that $178,000 worth of group insurance has been taken out by 22 members. The poster-billboard program now has 43 signboards on the highways of the state, promoting the use of limestone for soil conservation and betterment. Groups from several adjacent states have evinced interest in using like methods of promotion. Mr. Allen reported that I.A.L.A. now has 88 members, and it is hoped that ten or more will be added in the coming year.

Mr. Allen also told of several meetings with various farmer groups held to promote initiating county surveys which would accurately determine the aglime needs of each county for soil conservation. While there is some divergent opinion among agencies as to the proper method of making soil tests, he feels that real co-ordination on the subject was reached last year. He said that the acreage allotment passed by the legislature last year requires adherence by farmers to the individual figures set in each case, in order to obtain help in purchases of limestone.

Reports of committees followed. The resolutions committee recommended opposition to Section 348 of the state code, and to House File 398, about to be considered by the state legislature, as detrimental to the interests of producers of aglime or other fertilizers. It has been said that the latter bill, limiting loads of explosives hauled on state highways to 500 lb.

Right: Melvin E. Raid, retiring president, and Clint A. Allen, executive secretary-treasurer of the Iowa Agricultural Limestone Association.

Below: A group of officers of I.A.L.A.: K. K. Kinsey, Concrete Material and Construction Company, Cedar Rapids, director; W. A. Schemmer, Schemmer Construction Company, Logan, director; Wood W. Weaver, Weaver Construction Company, Iowa Falls, president; Ben Ravitz, Wapello Stone Quarries, Ottumwa, director; and Ray A. Potthoff, Kaser Construction Company, Des Moines, vice-president.



Left: Some of the speakers at the luncheon meeting. (left to right): Miss Diane Windsor; John H. Riddle, president, National Agricultural Limestone Association; and Leo Elthon, Lt. Governor of Iowa.
Right: Dewey Cornell, program director of the Iowa A.S.C. Committee, described the producers stake in the A.C.P. of the State.

would retard the conservation program. The committee also recommended that the secretary-treasurer be authorized to work with the proper state agencies in combating this legislation and in effecting better coordination of state and federal agencies toward breaking the bottleneck still existing in soil testing work in Iowa.

The nominating committee presented the names of the following members to act as directors for the next three years: K. K. Kinsey, Concrete Material and Construction Co., Cedar Rapids; W. A. Schemmer, Schemmer Construction Co., Logan; Ben Ravitz, Wapello Stone Quarries, Ottumwa; and Ray A. Potthoff, Kaser Construction Co., Des Moines. Wood W. Weaver, Weaver Construction Co., Iowa Falls, was nominated to fill the vacancy created by the resignation of E. H. Mathias, director. In a meeting of the board of directors that afternoon Mr. Weaver was elected president, and Mr. Potthoff vice-president of the association for the ensuing year.

Dewey Cornell, program director of the Iowa A.S.C. committee, presented the major address of the morning session, speaking on the subject *The Limestone Producers' Stake in the Agricultural Conservation Program.* In describing acreage allotments, Mr. Cornell stated that these are applied, for example, when the corn supply of the state reaches a certain point, and the Secretary of Agricultural makes the allotments with a 15 percent carry-over authorized. A price support of this kind is reasonable and helps the farmer, but it limits the aglime business of producers.

Mr. Cornell stated that an allocation of $8,972,000 for Iowa in 1955 was granted by the Congress to offset the allotment limitation. In describing the decrease in limestone shipments in Iowa, he pointed out that 2,224,000 tons were shipped in 1952, and only 1,220,000 tons in 1953. Data on such shipments in 1954 were available from only four counties, all of which were heavy users of limestone. Shipments in these counties were from 50 to 100 percent greater than in the preceding year. Funds were distributed to counties, he feels, according to the aggressiveness of the interested producers and farmers in each county. He urged that every effort be made to utilize the allotments, as any unexpended surplus is returned to the government. He also urged that the services of the county agents be utilized in obtaining proper samples in soil testing.

He pledged that he would do all he could to cut the time required to receive results of soil tests, which now reportedly takes three to four months, and pointed out that reports of tests for aglime need alone could be obtained in five or six days.

Mr. Cornell cited three types of land where limestone can be effectively used: on land which is on regular rotation, or out of production for 4 to 5 years; on land which will be seeded in 1955 or 1956; and on pasturage, in which the cost-sharing rates are about 50 percent. In order to get financial help in conservation treatment, the farmer must do as follows: he must request the county agent for a definite amount; he must have his soil tested to determine needs; he must set expiration dates, determining when the limestone is added to the soil; and he must stay within his corn or wheat allotment. A limit of $1,500 is set on the cost of the fertilizer used.

Robert M. Koch, Washington, D. C., executive secretary of the National Agricultural Limestone Institute, Inc., spoke briefly on legislation affecting the 1956 A.C.P. appropriation and on new developments regarding percentage depletion. He feels that the $250,000,000 appropriation for the 1956 national conservation program will be allowed to stand, despite the fact that the Secretary of Agriculture advised cutting the figure to $175,000,000 and setting a definite date of termination of this appropriation. He said that the N.A.L.I. had tried to get a 15 percent percentage depletion allowance for all limestone, but had succeeded in obtaining this figure only for aglime, other end use taking the 5 percent allowance.

Commenting on the present problem of determining a proper method of soil testing, Mr. Koch said that no two states have identical requirements, and that a common meeting ground should be found to determine an accurate method which will set the pH content at the proper level, wherever this might be. Seven states now have mandatory soil-testing programs in each of which the method varies.

A group of distinguished guests were present at the noon luncheon, including Lt. Governor Leo Elthon; Clyde Apry, secretary of agriculture of the state of Iowa; Dr. Louis L. Thompson, in charge of farm operations at Iowa State College; John H. Riddle, president of N.A.L.I.; and various other Des Moines and state officials interested in the conservation program.

Miss Diana Windsor, formerly of the London stage, briefly related her experiences in this country and presented some humorous aspects of her visit here which were enjoyed by all.

Lt. Governor Elthon briefly addressed the meeting of "his own association," as he called it. He praised Clint Allen, executive secretary, for the efficient manner in which he had pursued the pertinent legislative matters of the association at the state level. In the eternal quest for more revenue, said Mr. Elthon, the state is considering placing a sales tax on agstone. He urged the producers to maintain the high level of promotion they have followed by convincing the farmer and general public of the vital need for using agricultural limestone in soil-building practice.

(Continued on page 130)

New Crushing and Screening Operation at Quarry

INCREASES CAPACITY Of 3M's Roofing Granules Plant at Wausau

By WALTER E. TRAUFFER

MINNESOTA Mining & Manufacturing Company on July 26, 1954, put into full operation a new and very modern preliminary processing plant to supply its roofing granules plant in Wausau, Wis. This new and completely modern operation has a capacity of 145 t.p.h. of 35-mesh to ¼-in. material. By doing the first three stages of crushing and the first stage of screening at this new plant the company has stepped up the efficiency and capacity of the entire operation considerably. This is a year-'round operation and the quarry and new crushing plant are designed to supply the main plant regardless of weather conditions. The quarry is operated one shift and the crushing plant three shifts daily.

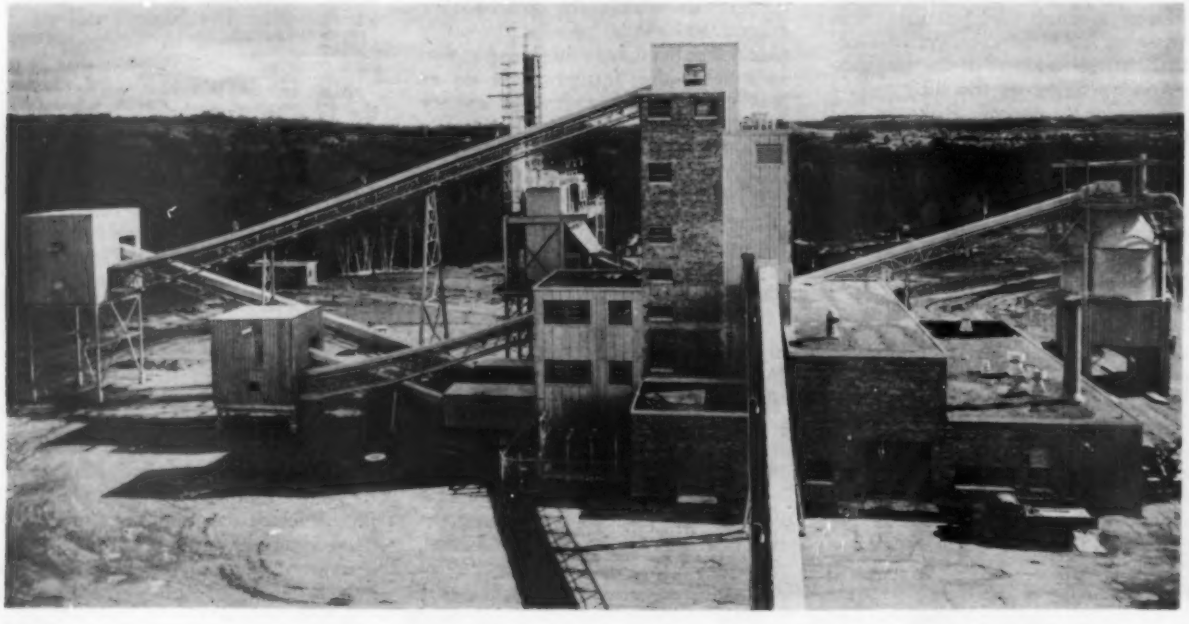
The deposit being worked is pre-Cambrian argillite, a fine-grained metamorphosed silt stone formed and recrystallized by heat and pressure, similar in origin to many slate deposits. Argillite deposits of suitable properties are very rare. 3 M's operation is in a large formation of argillite which varies from a coarse conglomerate to a fine-grained material. This specific quarry site was selected to produce material most desirable for roofing granule use. The stone quarried is opaque and very dense with an Moh hardness of 6½ to 7, and a compressive strength of 60,000 p.s.i. It has a specific gravity of 2.66 to 2.70 and weighs 166 lb. per cu. ft. The deposit is a blocky formation with minor fault seams and jointing.

The deposit is in the form of a hill, partly cut away by the Wisconsin River, and test drilling 135 ft. down to river level showed good material at least that far. Enough material has been proved out for 75 years of operation. The quarry was opened by cutting in near the top of the hill, and a first bench of 50 to 60 ft. was developed. A second bench of the same height is now being worked. As the material varies somewhat in character in different locations, selective quarrying is done.

The overburden varies from 3 to 12 ft. in depth, with an average of 6 ft. This is removed at intervals with the shovels and trucks used in the quarry.

The roofing granules plant at Wausau was built in 1933, and was at that time completely described

A general view of 3 M's new plant, taken from the stockpiling conveyor house. The reclaiming conveyor is in the foreground; the truck loading building is at the right.



in these pages.* It then had only one kiln, and the raw material was obtained from Rib Mountain a few miles away. Since then the plant has undergone several expansions, particularly between 1934 and 1945, which included the addition of two kilns and other necessary equipment to match. The present quarry was first opened in 1937 when it was found that the argillite was more suitable for granule use than the Rib Mountain quartzite. As before, the stone was hauled direct from the face to the primary crusher at the plant. To meet recent increased demand, and because of limited space at the plant, it was decided to build the new crushing and screening plant at the quarry site. This new arrangement resulted in an increase in the overall capacity of the main plant.

In laying out the quarry shots the aim is to take 18 to 20 ft. of burden. Single-row shots of 6 or 7 holes are usually made and delay caps are used to minimize noise and vibration. Drilling is done with two Bucyrus-Erie churn drills—a 42T electric and a 29T gasoline-driven machine—with 11-in. and 9-in. bits, respectively. Both drills are now working on the lower level. Holes are loaded with Atlas 40 percent gelatin dynamite in the bottom and Atlas Apex at the top. Firing is through electric caps in the bottom of the hole, the amount of delay being varied with conditions. Usually No. 1, 2, 3, 4, 5 and 7 millisecond delays are used. A standard blasting machine is used. Holes are heavily loaded for maximum fragmentation rather than tonnage, and the yield averages about 2½ tons per lb. Every possible alternative method has been tried out, including multiple rows, closer spacing, etc., but the one in use has given the best results.

Ordinarily very little blasted stone is too large for the primary crusher, and no secondary shooting is done except to lift out humps in the floor and toes at the face. All secondary breakage is done by dropballing with a U. S. Steel Company 34-in. square by 36-in. long steel forged billet weighing 13,000 lb. This shape is preferred because there is very little roll and consequent strain on the boom. It is also said to be excellent for trimming down the quarry face. The ball is handled by a 1¾-cu. yd. P&H crane with a 60-ft. boom, and a 30-ft. to 40-ft. drop is used.

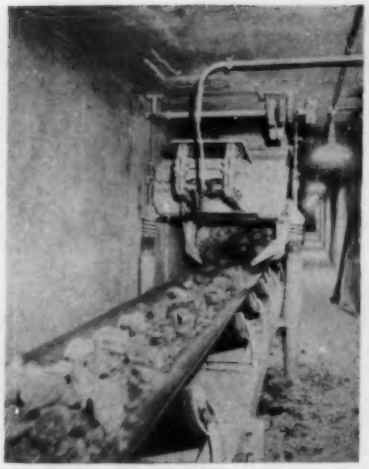
The stone is loaded into trucks by a Bucyrus-Erie 110B electric shovel with a 4½-cu. yd. dipper and an air-conditioned cab. The shovel receives its power through a 1000-ft. Anaconda cable from a central outlet station in the quarry. The power line into the station is in a trench blasted out of the quarry floor. There are also two other shovels—a Bucyrus-Erie 54B with a 2½-cu. yd. dipper and a 2½-cu. yd. Marion—both diesels. These two shovels are used for stripping and are in reserve in the quarry.

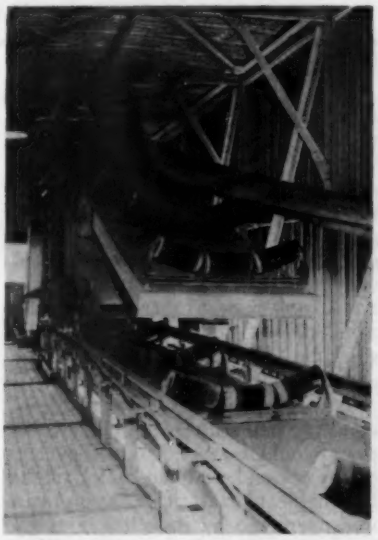
The trucks are Euclid 36TD's with 20-ton capacity rear-dump bodies and Cummins diesel engines. They have single rear axles with dual tires, power steering, and all other modern features. Three trucks are used with a one-way haul of about ¼ mile. All roadways are weatherproofed and they are kept open and in condition the year around with a bulldozer and a Galion grader and snow plow. At the plant the trucks back up to dump into either end of the 42-in. Traylor gyratory primary crusher, which is driven by a 300-hp. General Electric motor.

A Jeffrey 48-in. electric vibrating feeder discharges the minus 4-in. stone onto a 36-in. by 365-ft. belt conveyor, which is also the stockpiling conveyor. It is inclined to a height of 35 ft. above its feed end and is then horizontal for 200 ft. over the stockpile area, which is at

*See PIT AND QUARRY, *Quartzite Granules Manufactured in New High-Efficiency Minnesota Plant*, October, 1934, pp. 26-34, by Walter E. Trauffer.

Right: Special adjustable vibrating feeder in stockpile reclaiming tunnel.





Traveling tripper which distributes material in raw stockpile.

Three of the four cone crushers used in this plant. Two are used for secondary reduction, the others for final reduction.

Another view of the plant, with part of stockpile (left). The truck-loading building is in left foreground; dust collectors in the right foreground.

a considerably lower level. This conveyor is driven at a house between the crusher and the stockpile by a 60-hp. General Electric motor through a Link-Belt herringbone gear reducer, and a double-pulley gravity arrangement is used to provide the necessary tension. A pulley-type Link-Belt tripper chutes the stone to any desired section of the stockpile. The tripper is moved by a gearmotor and chain drive.

It was anticipated that this 36-in. conveyor belt with its many convolutions would become so stiff over a cold week-end that the motor might be unable to start it. This problem was overcome by installing a creep arrangement at the conveyor drive. A 2-hp. motor, connected by a clutch, keeps the belt moving slowly in cold weather when it is not in use. The tripper house and the conveyor framework are mounted on two heavy tubular steel bents, so that movement of the stockpiled stone will not affect them. The far end of the framework is cantilevered, and the near end is pin-connected to allow radial motion.

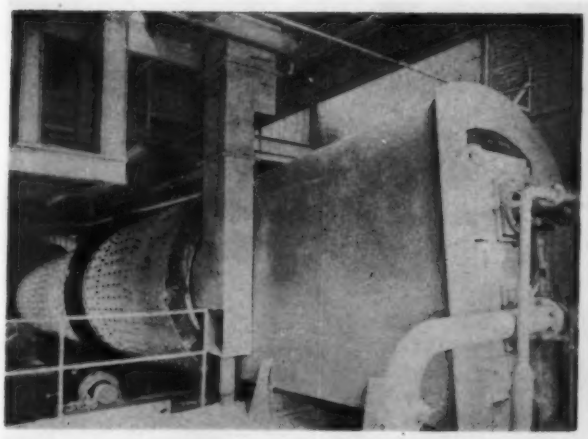
The stockpile has a total capacity, without rehandling, of 48,000 tons, of which 15,000 tons is live storage reclaimable through four openings in the top of the 250-ft. concrete reclaiming tunnel. A bulldozer is available for rehandling when necessary. At each opening is a Jeffrey electric vibrating feeder with its back end suspended from springs and its front end mounted on springs and connected by cables to a winch which can raise it clear of the material on the belt when it is not in use. There are two springs at the front end, one on each side, and each is attached to a section of steel pipe which telescopes into a vertical steel standpipe. The latter has a bottom section of pipe of the same diameter as the telescoping section and a top section of larger diameter which is telescoped over and welded to it. When the feeder is lowered by the winch into operating position, the pipes attached to the springs rest solidly on top of the bottom section. When not in use, the winch raises the feeder; and pins through holes in the attached pipe sections insure that the feeder will stay above the material if it should accidentally drop.

The method of controlling the feed from the stockpiles to the crushing department is also interesting. Whenever a change in the feed is desired—usually a few times daily—a plant man enters the tunnel and prepares the desired feeder. He then sets the selector switch, and the operator at the main control board can control the rate of feed to fit the crushers being used.

The 30-in. by 400-ft. tunnel belt conveyor inclines into the crusher building and is driven by a 20-hp. General Electric gear motor. A Stearns magnetic head pulley removes any tramp iron ahead of the crushers. A spout is arranged so that the rock can be discharged into either of two Symons 5½-ft. standard cone crushers, or into both of them. Usually only one crusher is used; it is fed at the rate of 200 t.p.h., and reduces to minus 1½-in. Each of these crushers is V-belt driven by a 200-hp. 900-r.p.m. motor.

The stone is discharged from the crushers onto two short 24-in. elevating belt conveyors in series, respectively 150 and 92-ft. long, which carry it out of the building and back to a drier feed hopper in the same building. The stone drops from the hopper through a vertical spout alongside the firing chamber into the Bartlett & Snow 8-ft. 6-in. by 65-ft. single-pass, parallel-flow rotary drier. This is lined full length with manganese steel lifters. Firing is done through a refractory-lined Dutch oven combustion chamber equipped with two North American oil burners. Only the lower burner is used, except when the stone is very wet from rain or snow. A drying temperature of 140 to 150 deg. F. is normally maintained. The drier is driven

Trucks discharging their 20-ton loads to the primary crusher hopper. Note that snow does not stop operations.



The rotary drier which receives material from the secondary crushers. Note two burners on combustion chamber at right.

Five of the ten rotary reciprocating screens which do all of the sizing. Note the chutes from the five screens on the floor above.

through a D. O. James gear reducer by a 150-hp. motor.

The dried stone is discharged direct onto a 24-in. by 42-ft. short horizontal belt conveyor which is equipped with a Trans-Weigh belt weigher. This device has a generator driven from the belt, which generates current in proportion to the belt speed. This current passes through a resistor coil in which the resistance is varied directly by the weight passing over the conveyor. The current is then recorded in terms of t.p.h. on a dial on the main control board. There is also a cumulative counter for total tonnage of dried stone processed.

This conveyor discharges the dried new feed on top of the material from the two 5½-ft. Symons shorthead finishing cones (circulating load) on the first of the two long 36-in. conveyors, respectively 225 and 192-ft. long. These carry the material outside the crusher building and back into the top for feeding to the screens. The stone is discharged from this conveyor into a revolving spout distributor which discharges into the spouts to ten screens, five over each of the two crushers. The spout revolves at moderate speed, keeping a steady feed to all of the screens. Usually both sets of five screens and both shorthead crushers are operated; but either set can be cut off by closing the screen feed spouts.

The ten screens are Orville Simpson Rotex 40-in. by 10-ft., 3-deck machines with ¼-in. (0.232-in.) mesh wire cloth on their top decks and No. 166 Tyler Ton-Cap (about 35-mesh) on their bottom decks. The oversize (¼- to ⅜-in.) from each set of five screens drops into a bin feeding a 5½-ft. shorthead cone finishing crusher. A slide gate can shut off the feed to each crusher. The product of the two crushers (No. 3 and No. 4) is discharged, as previously described, on the first of the two conveyors which take the new feed from the drier to the screens, forming a closed circuit for the recrushed material.

The 35-mesh to ¼-in. material over the bottom decks of the ten screens is carried on a 24-in. by 40-ft. conveyor to the 106-ft. inclined conveyor to the truck-loading bin. A second Trans-Weigh unit on this conveyor also records on the main control board.

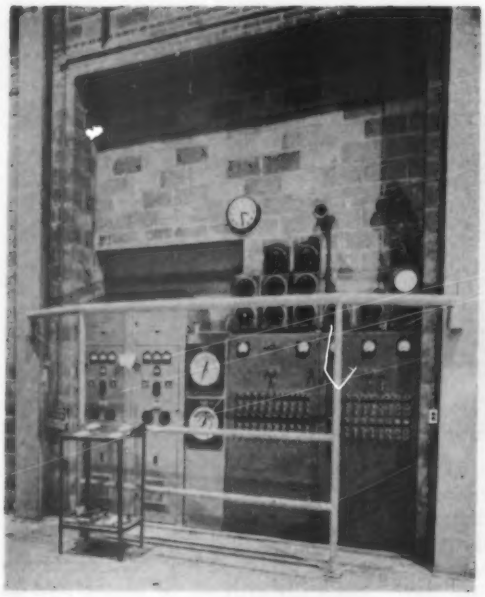
The fines (minus 35-mesh) through the bottom decks of the screens are spouted to a bin and carried in covered dump trucks to a waste pile. This is sprinkled in dry weather to keep down the dust. As soon as the fill level is reached, the pile is covered with dirt. This material forms about 20 percent of total output.

The 460-ton steel truck-loading bin is circular and has a conical enclosure on top and a conical bottom. A special arrangement under the bin and on the trucks which haul the products of this plant to the main plant make possible quick and dustless loading without spillage. This hauling is done with Kenworth tractors with 20-ton Omaha trailers. Curbs and markers under the loading bin insure accurate spotting of the trucks for loading. Under the bin is a long plow end metal discharge frame open at the bottom. The truck has a narrow slot opening at the top with longitudinal rubber flaps on each side which close the opening. As the truck pulls into place the plow separates the flaps, and loading proceeds through three discharge spouts. Two suction openings connected to a collector prevent dust loss. The loading gates are air-operated by levers opposite the truck cab. The loading spouts are so arranged that each one automatically cuts off to slower feed as the material piles up, and then shuts off. When the truck pulls slowly out after loading, the residue in the spouts fills in the hollows in the load, and the truck flaps close up and seal it.

At the main granules plant the trucks are driven into an enclosure over a 35-ton receiving hopper. Curbs are arranged to line up the trucks for accurate discharge. A Bindicator keeps a red light lit when the hopper is too full to take a load. When the light is off, the truckload is discharged through air-operated clamshell gates through a grating into the hopper. A belt conveyor and bucket elevator feed the stone to four crushing rolls which comprise the first step in this operation.

Every possible precaution is taken in this plant to control dust, primarily for the health and comfort of the employees. The dust collection system is so efficient that, in spite of the siliceous material, the only employees required to wear respirators are the man who loads out waste fines and the bulldozer operator who distributes it. Dust counts made in all parts of the operation at regular intervals show the dust count to be far below the danger point.

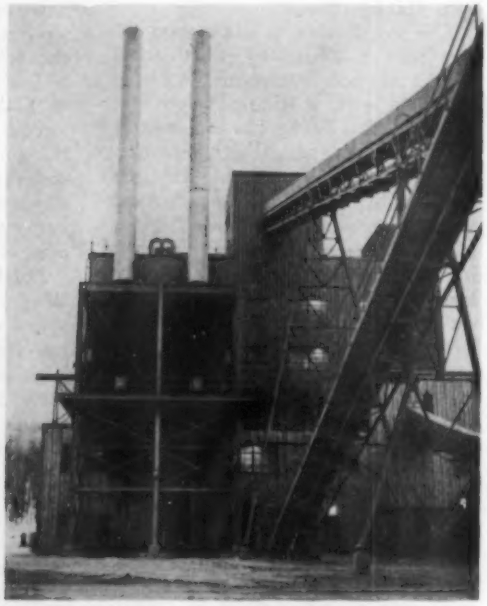
A Western Precipitation Corporation Multiclone dust collector is connected to the primary crusher discharge hopper. On dry days a spray on the tripper lays the dust in storage. Five other Multiclones are also connected, one to the main crushing and screening exhaust system discharge end of the drier, one in each of the conveyor transfer houses, and one at the top of the loading building with a lead to the



The main control board from which the entire plant is operated. Note the warning signal lights above.

One of the special 20-ton trailer trucks under loading bin. These haul finel product of the plant 5 miles to the 3M roofing granules plant in Wausau.

Chutes from the ten sizing screens discharge their product on this belt conveyor to the truck-loading bin.



Some of the dust collectors which keep this plant clean.

loading spout. There are also two Research Corporation Cottrell electrical precipitators, one connected to the drier discharge and the other to the crushing and screening exhaust system. Each precipitator has an individual stack.

The entire plant is equipped with interlocking electrical controls throughout. The primary crusher, feeder, and stockpiling conveyor form one interlocked system; all equipment from the feeders under the stockpile to the conveyors to the truck bin is interlocked in another system. The main control board in the plant has a panel for each of the two Cottrell precipitators and dials for each of the two conveyor weighers. There is a panel for the finishing cone circuit, and one for the preliminary cones and the feeders under the stockpiles.

The main board also has warning lights for various operations; there are lights for the bins ahead of each of the finishing cones. One warns when the drier stack temperature is too high and another when the truck loading bin is nearly full. Another control circuit on each cone crusher measures the oil temperature and the cooling water temperature. If these go too high, the feed to the crusher is shut off; and after a time delay to clear the material out of the crusher, it shuts down.

Water for all purposes is obtained from a deep well with a capacity of 600-g.p.m. This is used for drinking, service, sanitation, cooling, fire protection, etc. A 135-ft. tank with a capacity of 100,000 gal. provides ample pressure, even at the top of the plant. An Imhoff tank is used for the treatment of sewage.

Complete comfort and safety facilities are provided, including lockers, showers, first-aid room, etc. A Bros oil-fired packaged boiler provides steam for space heaters throughout the building and for heating the fuel oil for the boiler and the drier. This boiler has all automatic control and safety features.

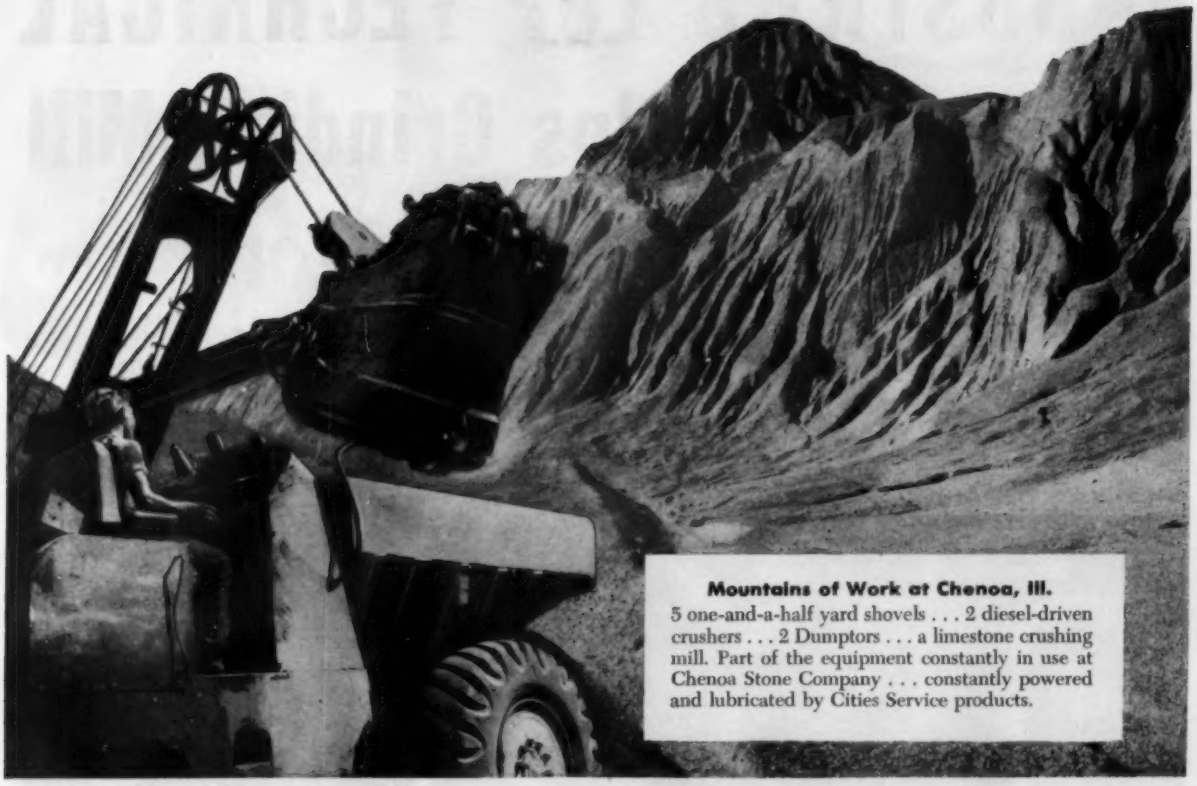
This new crushing and screening plant was designed by the company's

(Continued on page 117)

Cities Service C-300 cuts make-up oil 600%!

Stone cold facts from the

Chenoa Stone Company, Chenoa, Illinois



Mountains of Work at Chenoa, Ill.
5 one-and-a-half yard shovels . . . 2 diesel-driven crushers . . . 2 Dumptors . . . a limestone crushing mill. Part of the equipment constantly in use at Chenoa Stone Company . . . constantly powered and lubricated by Cities Service products.

Here's the story in the words of David D. Vickrey, Superintendent of Chenoa Stone Company:

"About two years ago, we switched from another nationally prominent brand oil to Cities Service C-300 Series Motor Oil. The results have been amazing.

"C-300's detergent action completely eliminated a bothersome sludge problem. On our first three oil changes with it, we removed 5 gallons of sludge from each of our 200 horsepower diesels. Since then, these diesels have remained clean, and today, when we open the crankcase, we can even see the paint.

"We also are using far less oil between changes. In fact Cities Service C-300 actually cut make-up oil from 5 to 6 gallons every 150 hours to less than one gallon every 150 hours!

"In addition to C-300 oil, we use Cities Service Lubricants for every requirement... Diesel Fuel, Gasolenes, Trojan M Grease and hydraulic fluid. We have been completely satisfied with every product.

"Cities Service has given us top-notch service, the best we've ever had. We are better supplied than ever and have learned to rely on Cities Service dependability."

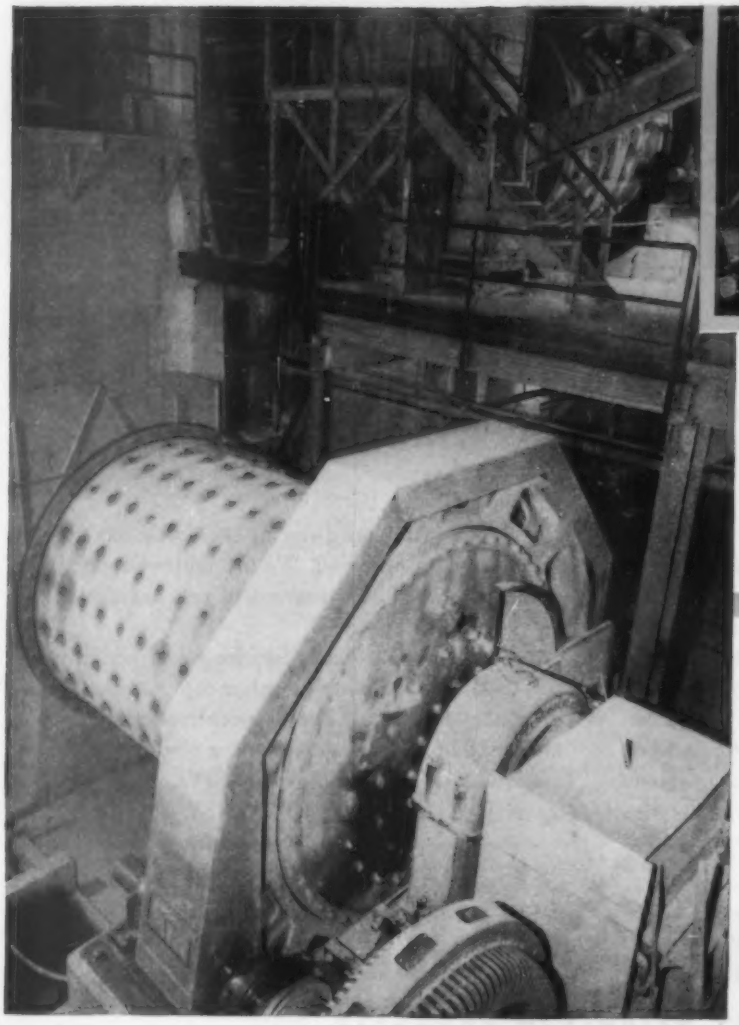
There is nothing Cities Service could possibly add to Mr. Vickrey's statement, except a reminder to contact your local Cities Service representative in order that you may enjoy similar results in *your* operation. Or write: Cities Service Oil Company, Sixty Wall Tower, New York 5, N. Y.

CITIES SERVICE

QUALITY PETROLEUM PRODUCTS

Here's How INDUSTRY'S TOP TECHNICAL Helps Grinding Mill Operators

HELPS PLANT AND CONSULTING ENGINEERS — Here's the way it works. Let's suppose you are building a new concentrator and you want information and recommendations on crushing, grinding, screening, process flow and equipment needed. Allis-Chalmers specialists, familiar with the process problems involved, work with your engineers to provide a solution.



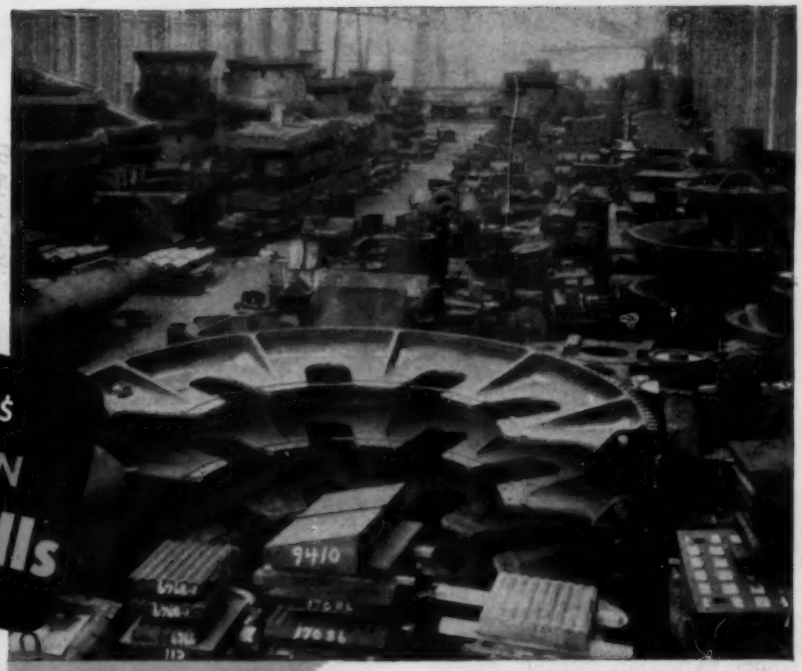
TESTS ORE SAMPLES — Ore samples are sent to the A-C laboratory for crushing, grinding, screening and additional tests to determine the equipment and process best suited to produce the desired end product. This laboratory is one of the best-equipped, best-staffed in the country. View of a section of the pilot grinding mill is shown.

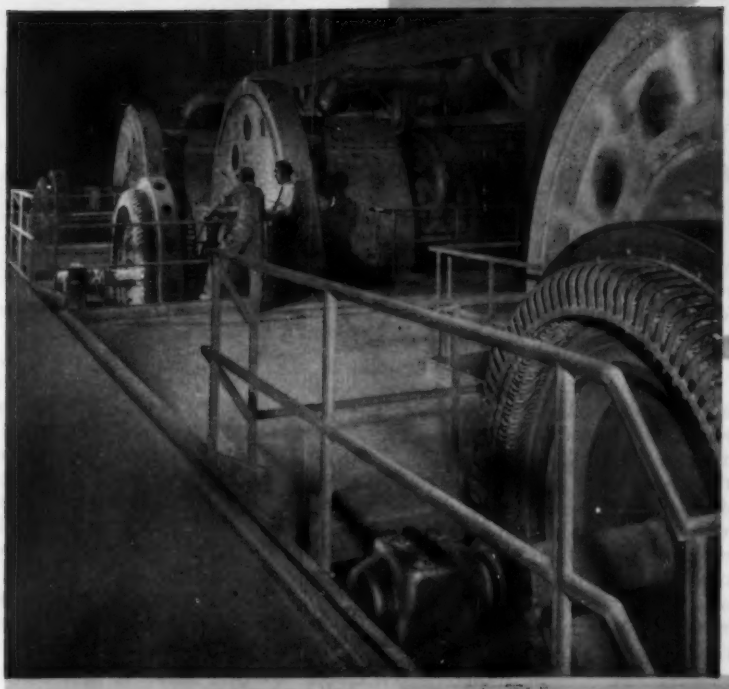
FURNISHES INFORMATION ON PROCESS FLOW AND EQUIPMENT — From lab test information and wide experience gained in solving similar problems, a flow sheet and a list of needed equipment are worked out. In the plant shown here, Allis-Chalmers recommended and furnished the rod and ball mills.

ALLIS-

TEAM

ALLIS-CHALMERS' PROGRESS IN **Grinding Mills**





PROVIDES CONTINUOUS SERVICE—When maintenance is necessary, a telephone call will put another A-C team to work on your problem. Complete records are kept on every Allis-Chalmers grinding mill. If parts are needed, these records are checked, and *exact* duplicate parts are speeded to you. Your nearest A-C District Office is always ready to help you. One section of the tremendous inventory of parts stocked at A-C is shown in this photo.

A COMPLETE PLANT OR A SINGLE MACHINE—Because Allis-Chalmers builds many types of equipment . . . crushers, grinding mills, screens, washers, kilns, coolers as well as the electrical power generating equipment, motors and controls, they can furnish a whole plant or a single machine. Allis-Chalmers offers the advantage of undivided responsibility for the complete process and equipment package.

AN ALLIS-CHALMERS TECHNICAL TEAM is always ready to work with your plant or consulting engineers on your grinding or processing problems. To take advantage of their services, call your nearest Allis-Chalmers District Office, or write Allis-Chalmers, Milwaukee 1, Wisconsin. A-4292

ALLIS-CHALMERS EQUIPMENT FOR THE MINING AND ROCK PRODUCT INDUSTRIES

Crushers, all types — Vibrating screens, all types — Kilns — Coolers — Washers — Dryers — Smelting equipment

CHALMERS

A-C ALLIS-CHALMERS

No Butterfingers Allowed To Operate These Shovels For Azusa Rock & Sand Co.

Ever had your hat creased by a ton and a half of rock? If not, you haven't lived—that's the opinion of Art Baker, well-known television figure.

Having such an unusual hat-creasing was just one of the amusing—and suspenseful—stunts that he filmed at the Azusa Rock & Sand Company, Azusa, Calif., for televising on his February 20 *You Asked For It* show. Art's show that night graphically pointed out to a large audience that those bulky, huge machines they have often seen are not clumsy tools by any means, and that the men who operate them are virtuosos in their own right. They are, at least, when they have skill equalling that of the quartet from the Azusa firm who participated in the show. The four men who ran the Lima 1601 shovel and two 25-ton cranes were Dan Morgan, Walter Lathrop, Charles Dyer, and Hal McRoberts.

● Shown with one of the big shovels which they operated in a recent "You Asked For It" show are Dan Morgan, Walter Lathrop, Charles Dyer, and Hal McRoberts — all of the Azusa Rock & Sand Company, Azusa, Calif.

During the demonstration the crane, fitted with a clamshell bucket, picked up a glass of champagne and placed it in Art Baker's hand without cracking the glass or stem and without spilling a drop. Feeling this wasn't difficult enough, Dan Morgan went on to maneuver the crane so that the big bucket nudged up to Art Baker and removed a cigarette from his mouth, then replaced it without losing an ash.

Walter Lathrop then took the controls of the 3½-yd. shovel; he picked up a plate containing a lighted candle, and then replaced it, with the candle still upright and lit.

To put the finishing touch to the demonstration, Charles Dyer put the crease in Art Baker's hat with a 1½-ton rock rigged as a drop ball.

Latest Improvements In Flat Transmission Belts

By J. A. MULLER
Executive Engineer
Thermoid Company, Trenton, N. J.

Although flat transmission belts are giving way to V-belt drives, direct drives and gear reduction drives, there are still thousands of flat belts in operation transmitting millions of horse-power in various industries in many sections of the country.

Because the replacement of flat belts still represents a sizable amount of business today, belt manufacturers are contantly making improvements in belt design. Rayon fabric instead of cotton duck, for instance, permits thinner belts. Thinner belts mean less heat build-up in flexing around the pulleys and, therefore, longer life, A slight weight reduction is also obtained buy using thinner belts.

Although a transmission belt is almost all fabric, there is some rubber. Better rubber compounds available today add to the belt life by improving adhesion, reducing the effects of oxidation, and resisting wear and abrasion.

Belt splicing plays an important part in belt life. Metal fasteners are most widely used, but care should be exercised to obtain the correct size and type for the particular service. Installed correctly and well-maintained, they will give good service; and belts joined with metal fasteners can be shortened easily. Endless heavy-duty flat belts are also furnished with vulcanized splices.

For peripheral speeds of 6,000 f.p.s. in applications in which speeds are constant with infrequent starting and stopping, flat belts provide an inexpensive means of transmitting power, especially when the distance from the driver pulley to the driven is great.

Many ingenious flat belt drives have been designed by individual engineers for specific applications. Although most flat belt drives involve parallel shafts, it is practicable to con trive drives in which one shaft is placed at almost any angle with respect to the other.

● Well designed flat belt drives will improve belt performance and extend belt life.

Here are a few tips on designing angular flat belt drives:

(1) The belt must be delivered in the plane of the pulley toward which it is running.

(2) Use pulleys as large in diameter as practical.

(3) Keep center distances between pulleys as long as practical.

(4) Sufficient space must always be provided between pulleys of an angular drive to permit the belt to turn or change its plane.

(5) Be sure that the belting is the proper kind, width, and thickness for the drive. While the use of good belting is recommended for any drive, it is particularly necessary for angular drives.

(6) Arrange guide pulleys to assure the minimum flexing of the belt.

(7) Make sure "mule" pulleys are heavily crowned, in order to hold the belt properly.

(8) Do not use flanges or guide plates unless absolutely necessary.

(9) Special belts for quarter-turn drives are usually made up by a half turn of the belt or by making one edge of the belt longer than the other.

(10) Use of proper design makes most angular drives reversible.

PETE HAUMONT, formerly in charge of equipment for the Arizona Sand & Rock Company, Phoenix, Ariz., is now plant superintendent.

"Eucs" pace production at Nelson Crushed Stone Ltd.

Powered by a 300 h.p. engine with 10-speed transmission, the Model 31 TD Rear-Dump "Euc" has a top travel speed of 32 m.p.h. with full payload . . . one of the reasons "Eucs" haul more tonnage at lower cost.

The limestone quarry and plant of Nelson Crushed Stone Ltd., north of Hamilton, Ontario, is one of Canada's newest and most modern operations. This stone plant, with a capacity of more than 500 tons per hour, was designed for maximum efficiency and flexibility—it can produce virtually any size stone.

Three 22-ton Rear-Dump "Eucs", loaded by a 2½ yd. shovel, haul dolomite to a primary crusher about ¼ mile from the face. Equipped with quarry bodies having flared sides that facilitate loading and minimize spillage, these "Eucs" have 300 h.p. engines and 10 speed transmissions.

Rear-Dump Euclids are standard off-the-highway hauling units in mines and quarries because of their ability to stay on the job year after year with low maintenance cost. For a production and cost estimate on your operation get in touch with your Euclid dealer . . . there's no cost or obligation.

Rugged construction of the body and frame enables "Eucs" to withstand the impact of loading rock and other heavy excavation with large loading equipment. Here a 2½ yd. shovel loads 22 tons of dolomite for haul to the primary crusher.

EUCLID DIVISION GENERAL MOTORS CORPORATION, Cleveland 17, Ohio

Euclid Equipment

FOR MOVING EARTH, ROCK, COAL AND ORE

GM GENERAL MOTORS

Black Point Aggregates, Inc.— A Profitable Venture

Approaching the Black Point Aggregates operation near San Rafael, Calif. from a slight elevation, a visitor has this view of the plant layout. At the right are the sand stockpile and the settling pond.

Cost of processing extremely dirty material is offset by saving in transportation costs

By HARRY F. UTLEY

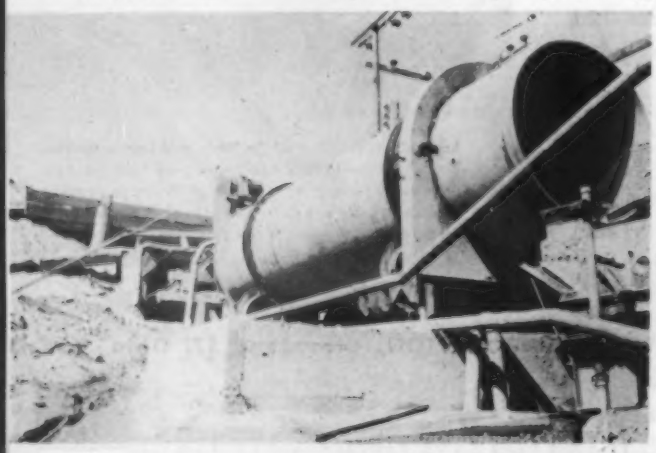
another P&Q exclusive

THE San Francisco and other Bay Area communities are dependent almost entirely upon outlying sand-and-gravel deposits to supply their need for construction aggregates. Most of the material is excavated and processed 25 to 35 miles east and southeast of San Francisco; and the booming communities in Marin County, north of the city across the Golden Gate, are largely supplied by the pits near the Russian River, about 60 miles to the north.

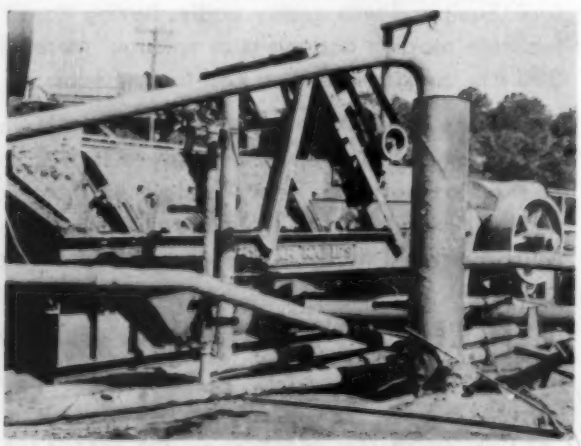
Black Point Aggregates, Inc., was formed a year or two ago to produce sand and gravel from a deposit near San Rafael, which is only about 15 miles north of downtown San Francisco. While the Black Point deposit was considered far from ideal in that large amounts of clay, soft rock, and other deleterious material were known to be present, requiring painstaking processing methods to yield specification aggregates, it was believed that the saving in transportation costs would more than offset the anticipated high cost of production.

The pit was opened and the Black Point plant began operating in September, 1953. Output of washed and sized material now runs in the neighborhood of 75 or 80 t.p.h. About 30 percent of the pit-run (10 percent soft shale and 20 percent clay and other colloids) is removed during processing. A revolving scrubber, a rotary disintegrator, eight attrition cells, two wet cyclones, and three screw classifiers are employed in the flow-sheet to accomplish the clean-up. Wash-water requirements are in excess of 1,000 g.p.m.

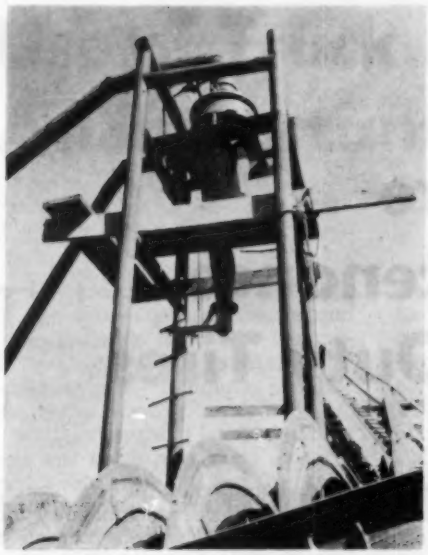
As the deposit occurs as a large hill above the plant, bulldozer-equipped tractors are used to push the material into a hopper which feeds to a Bodinson 6- by 30-ft. revolving scrubber. After an initial scrubbing, all the material passes to a Cedarapids double-deck vibrating screen which scalps off everything larger than 1½ in. on the upper deck and passes it to a Cedarapids 24- by 36-in. jaw crusher. The water and all minus ¼-in. solids passing the lower deck are treated in the sand circuit, while the intermediate sizes (minus ½- plus ¼-in.) join the product of the jaw crusher for further processing as coarse aggregates.



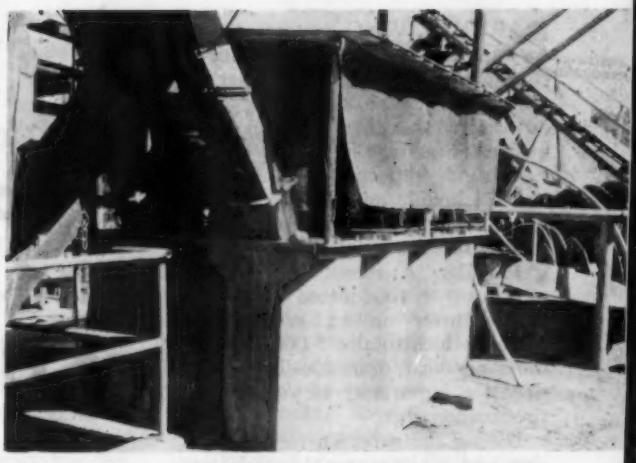
The primary scrubber, which makes the initial pass at cleaning up the pit-run gravel and sand.



Rejects from the scalping screen pass directly to the jaw crusher at the right.



Left: In this picture the wet cyclone is in process of being installed. It extracts fine sand from the screw-classifier overflow, which formerly went to the settling pond. When it was discovered that the sand was short of 200-mesh fines, the cyclone was installed to recover the extremely fine material.



Right: This 8-cell attrition machine scours the sand particles, removing a stubborn coating of clay. It is believed to be the first use of such a machine in a sand-and-gravel plant.

The coarse material at this stage contains considerable soft shale particles and clay balls. To eliminate these undesirables, all of the material must pass through another scrubber-disintegrator. This 5- by 40-ft. unit of extra-heavy steel construction was converted from its original use as a rod-mill. More water is added within the shell as it revolves, and the elimination of the soft rock and clay is accomplished by impact with four steel cylinders, each weighing 1600 lb., and two 800-lb. steel balls. The balls and rollers ride freely within the scrubber, each in its separate compartment. Sound aggregates are able to withstand the pounding of the balls and rollers, while the shale and clay chunks are disintegrated and pass through the ¼-in. mesh of a 4-ft. screen section at the discharge end of the disintegrator.

Clean coarse aggregates coming off the surface of the screen section are carried by belt conveyor to a Symons 3- by 10-ft. 2-deck sizing screen and the three finished gravels (minus 1½-in. plus ¾-in.; minus ¾-in. plus ⅜-in.; and minus ⅜-in. plus ¼-in.) drop to stockpiles *via* a shuttle conveyor.

Sand processing involves more complications than the gravel operation. Fine material passing the first vibrating screen and the troughs from the scrubber-disintegrator contain a high proportion of undesirable fines. These materials are pumped to a company-designed wet cyclone, which makes the initial rejection of some of the clay fines in its waste overflow. The cone underflow goes to a Wemco sand-preparation machine, which performs the second stage of sand processing. Fine material screwed up to the upper end of the Wemco spiral is fairly good sand at this point, except that many of the grains remain stubbornly coated with a clay film. Removal is accomplished by scouring in an 8-cell Wemco attrition machine.

Black Point Aggregates is believed to have made the first use of these machines in a commercial sand-and-gravel plant. They were originally developed by Del Monte Properties and Owens-Illinois to scour silica sand for glass manufacture at Pebble Beach, Calif.* Each of the 8½-cu. ft. cells, octagonal in shape, contains a set of rubber-covered agitator blades, some with reversed pitch, so that the sand particles are scoured by grain-to-grain friction. The attrition is produced in each cell separately, the eight impeller shafts being separately driven by eight electric motors.

After scouring in the attrition machine, the clean sand is split-fed to another pair of screw classifiers before it is stockpiled by an inclined belt-conveyor. While the processing as described produced a clean, sound sand as an end-product, there existed a deficiency in the minus 200-mesh fractions. This situation was largely corrected in the summer of 1954 by the installation of a Krebs D-20 wet cyclone above the final screw classifiers. The cyclone handles the waste overflow from the screws, extracting the desired extremely-fine sand as underflow which is blended into the dewatered sand at the upper end of the screws.

Recovery belts in the tunnels beneath the finished gravel and sand stockpiles feed to a 200-ft. long loading (or blending) conveyor, which delivers to the bins where the trucks are loaded.

Black Point Aggregates, Inc., has its headquarters at 115 Woodland Ave., San Rafael. Marshall L. Smith is president and general manager. O. D. Sisson, chief engineer, designed the plant.

*See PIT AND QUARRY, April, 1953, pp. 90-92.

3 M's New Plant

(From page 110)

engineering staff under the supervision of R. D. Comb, chief engineer of the Roofing Granule Division. The Link-Belt Company co-operated in the design of the belt conveyor system.

G. W. Swenson is vice-president in charge of the Roofing Granule Division, and M. W. Hart is production manager. At Wausau, E. J. McCarthy is plant manager, and R. K. Stephenson is production superintendent. J. E. Clarke is supervisor of crushing operations, and L. E. Goetsch is assistant supervisor. F. E. Carlson is superintendent at the Wausau quarry.

Douds Stone Quarry, Plant Acquired by Ottumwa Men

Purchase of the stock of Douds Stone, Inc., Douds, Iowa, has been announced by Leon Yates, and George and Bob Combs. Mr. Yates operates the Ideal Ready Mix Company, Ottumwa, Iowa, and his two associates are the proprietors of the Combs Sand Company, also located in Ottumwa.

The partners will operate the quarry under the same corporation name and will specialize in high-quality aggregate for concrete production. Ownership of the 320 acres controlled by the firm will assure a steady supply of crushed stone for both operations. Approximately 80 acres of the quarry tract have been mined.

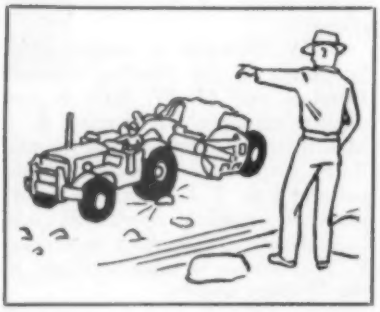
Proper Care and Maintenance of Heavy-Duty Tires

EARTHMOVING contractors and others using heavy rubber-tired equipment are constantly alert to the necessity for developing new economies as other costs in their businesses increase.

A rigid inspection and maintenance schedule on off-the-road tires has for some operators resulted in savings so substantial as to be almost spectacular. A recent tire maintenance survey conducted by a tire manufacturer on an earthmoving project which totaled 5,000,000 tire-miles per year dramatically emphasized the importance of attention to tire maintenance.

During the survey a rigid inspection and maintenance schedule was kept in effect, and haul roads were carefully maintained. The results showed increased tire life and decreased down time. Previously, tire inflation pressures were erratic; in fact, only 48 percent of all the tires were operated at recommended pressures. Variation of 20 to 25 lb. from recommended pressures was common. Cuts or minor damage had also been overlooked.

With the new and stricter maintenance schedule, 90 percent of all tires continually operated were within 5 p.s.i. of recommended pressure. Minor tire damage was quickly repaired to prevent further damage. Overall tire life increased 46 percent, and on one size an increase of 86 percent was recorded.



Maintaining a good haul road will usually pay a big dividend in the form of increased tire and vehicle life.

Proper inflation is one of the most important factors in tire care, and it requires little time and equipment. Each tire is designed and built to permit a definite percentage of deflection (flattening) in a particular type of service. As loads decrease or increase, inflation pressures must follow in order to maintain the deflection rate which has been calculated to provide maximum cushioning and tire life. Overinflation results in high cord stress and reduces resistance to blowouts from impacts. Underinflated tires are subject to increased deflection and excessive flexing. Operation of underinflated tires results in uneven or spotty tread wear, side wall radial cracks, ply separation, and broken cords inside the tire.

When tires are operated in soft soil or sand, tire inflation pressures can be appreciably lower than those recommended for pavement or hard gravel surfaces. The reason for this is that the tire makes a full impression in the soft surface and thus the tire is "cradled"—preventing extreme deflection.

A daily inspection for cuts, breaks, and sharp objects which might work into the casing is good preventive maintenance practice. Such inspections could be performed at the same time the inflation is checked. All deep cuts which have penetrated into the cord body should be repaired at once.

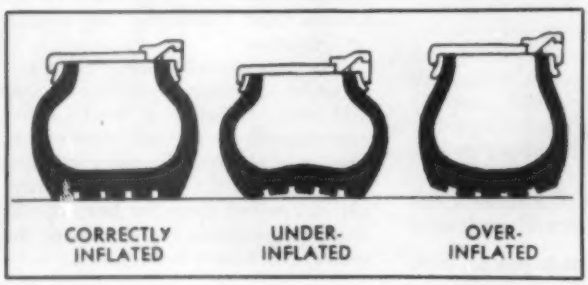
Failure to make regular inspections and to perform repairs when they are needed can result in unnecessary damage to tires. Small rocks and dirt can get into shallow cuts and, if neglected, may gradually be pounded through the cord body. One simple method of preventing extensive damage is to clean out small cuts with a knife or with a bull-nosed rasp to prevent the forming of a pocket which would allow rocks to work into the cord.

If the tire has at least one deep cut that requires repair, then all smaller cuts may be quickly and cheaply repaired at the same time. *Large* breaks should be repaired only if the tire is to be used only for light service work. Old tires with no more than 25 percent tread remaining are seldom economical for extensive repairs.

(Continued on page 120.)

Right: A daily inspection for cuts, breaks, and embedded sharp objects which might work into the casing is good preventive maintenance practice.

Below: Proper inflation is one of the most important factors in tire care; it requires little time and equipment.



Use of Truck Mirrors— An Important Factor In Safe Driving

By LYNE S. METCALFE

THE increase in motorized haulage — both percentagewise and in variation of loads — has carried with it a parallel vital need for achieving the maximum of road and highway safety.

State, county, and local regulatory laws and codes have done much to reduce accidents to and by commercial vehicles, as have also their manufacturers and owners, the men whose products they bear to and from market. Much has been done to hire and train better and more responsible drivers; and owners are demanding that they follow the rules of the highway and accepted practices of safe and prudent driving.

However, in recent studies of trucking accidents, in street, road travel and maneuvering, one of the most important (and often neglected) factors in trucking safety has been the driver's need to be able to *see* all about him at all times and instantly.

The vital importance of trucking in the nonmetallic mining industries has caused leaders to examine the risk entailed in haulage under today's conditions. They have taken measures to reduce accidents involving vehicles and products. Trucks of firms such as the Cleveland Builders Supply, McMichael Concrete Co., and Consolidated Rock Products have been equipped with the latest mirror attachments in proper combination to enable the driver to know—by sight—what is going on all about him at all times.

It is recognized by truck builders and truck owners that the maximum range of vision, instantly available at all times on the road, can be assured only by the proper use of side and fender mirrors. Furthermore, as truck speeds are stepped up and as traffic emergencies grow more complex, mirror designers have improved both the mirrors and methods of arranging them on the vehicles to permit maximum vision under any and all conditions.

Already the importance of vision is officially acknowledged by the fact that nearly every state in the union now requires not only a physical test of drivers, but also a test of their driving *vision*—in other words, a test of the individual driver's ability to *see*.

It is one thing to drive a passenger car reasonably safely with a centrally-located rear vision mirror, and quite another—as tests have proved —to drive a truck or delivery wagon safely without the supplementary service of a center. Depending entirely upon side mirrors on a truck is apt to prove a hazardous business, as many truckers have found out!

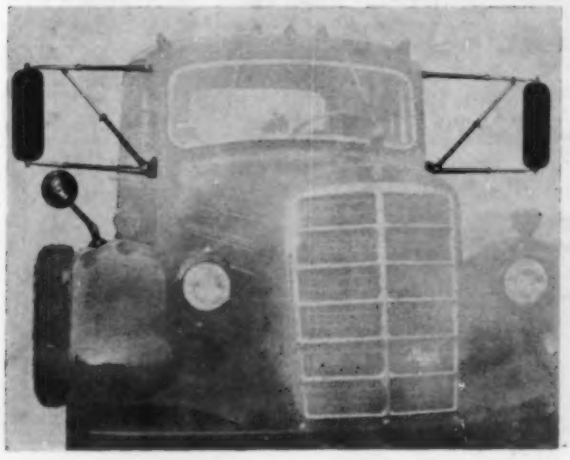
One great step forward is the introduction of the *convex* fender mirror. Considering the large number of trailer and semi-trailer trucks being used today, many question the need for four mirrors, but each one is designed for a special purpose.

Consider these facts: *The left fender mirror* is a driving mirror which warns of overtaking traffic, and its wide angle of vision comes into active use in preparing to make a left turn.

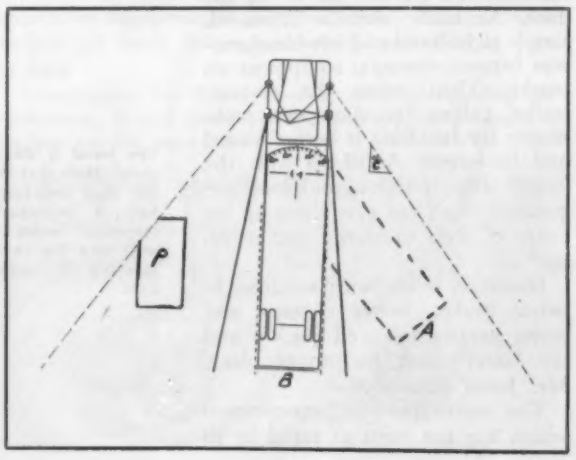
The right fender mirror is the right driving mirror and comes into play on right turns, permitting the driver to see his right trailer wheel when turning and thus avoid cutting. Both of these fender mirrors are necessary, particularly on multiple lane highways, and as the traffic volume increases.

On panel body trucks a right fender mirror makes it far easier for the driver to see any vehicle to his right; and, of course, a left fender

Below, left: Cab-mounted plane rectangular mirrors, which give an undistorted rear view, are necessary for a proper approach to loading platforms. The fender-mounted mirror reveals objects close at hand.



Below, right: With the trailer swung into position A, no truck could round a high curb corner C. Usually, the driver will pull his outside dual wheels over it. Hence, the vital need for a right-hand fender mirror.
The fender mirror is also important for a left-hand turn. Consider a truck moving down the road with the trailer in position B. The driver wants to pass the car ahead. Looking in his side mirror, the driver fails to note passing passenger car P. If this mirror is all he has on this side, he will usually pull over to the left, possibly forcing P off road. In a left-hand fender mirror, however, he can clearly see car P without taking his eyes off the road.



mirror serves as an excellent driving mirror.

Right and left plane mirrors on the cab are particularly useful when backing to platforms and when maneuvering; however, to use them on the road requires the driver to turn his head and take his eyes off the road, particularly in the case of the right-hand mirror.

Because of its generally slower speed, the truck is overtaken and passed by more vehicles than are private cars. Unless the driver is aware of these passers, he can not possibly drive safely. Backing is also a problem for the trucker because of frequent stops at loading platforms.

Safe truck driving therefore demands close study of the size, shape, location, and type of mirrors; also whether they should be plain or of controlled convex design, to give best results on the various body styles of vehicles.

Another matter that cannot be dismissed lightly is the need for vision quality in rear vision mirrors and in taking steps to insure their use. L. Eric Jones, president, Delbar Products, a pioneer in mirror design, has this to say on the subject:

"The day is gone for accepting a 5-in. round mirror of cheapest glass hung on an inadequate and weak arm. Using such equipment is just going through the motions of observing regulations, and it's worse than a waste of money. Imagine the effect on the driver whose co-operation is sought to drive safely when he is provided with such equipment. It's time the value of the well-designed quality mirror was recognized and such equipment given its place as standard.

"In the days of the two-axle trucks, and before the tractor-trailer came into use in the industry, drivers got along with a simple hand mirror mounted on the cab or on the door. As traffic volume increased, simple right-hand and left-hand mirrors became common equipment on trucks. Then came the tractor-trailer, calling for many new techniques for handling it both forward and backward. Accidents with the 'semis' were common, and some organizations all but gave them up because of their incidence and severity."

However, refinements resulting in better brakes, better engines, and better steering followed quickly, and the "semi" took its proper place, Mr. Jones pointed out.

The one important improvement which has not been so rapid in its development is that of fully effective driving *mirrors* with sturdier, adequate mountings.

In addition to the improvements made in ordinary "plane" mirrors, there has more recently been added the full *convex* mirror, which has opened an entirely new range and width of vision to the driver. Without turning his head and with just a slight shift of his eyes to left or right, he can now *see* through this medium what is going on at any instant all around him and maneuver his truck accordingly.

A convex mirror of correct curvature mounted on the right front fender permits the driver of a "semi" to see his right rear trailer wheel during an entire right turn.

Similarly, a left-hand fender mirror aids in a left turn; but it has an even more important function. The automobile passing a large truck well to the left is outside the field of view in the trucker's side mirror. After checking in this mirror, he might for various reasons pull over to the left himself. A fender mirror with its large field of view has saved many a serious accident of this nature. (See diagram.)

Let's all recognize that the driver is the key to safe and efficient driving, to safe delivery of the truck and of the load. The driver holds the key to his own safety and to the safety of those who share the road with him, but he cannot avoid what he cannot see.

A "semi" adequately equipped with mirrors carries the following:

(1) Plane rectangular mirrors at least 5½ by 8½ in. in size (preferably 7 by 16 in.) for left and right cab mounting. These are necessary to give an undistorted view to the rear, particularly necessary when approaching a loading platform.

(2) Left and right convex fender mirrors of correct curvature. Flat mirrors of comparable size cannot equal the field of vision of a diminishing mirror. However, despite the advantage of a larger field of view, judgment of distance is more difficult.

By combining the two types the driver gains maximum protection. His fender mirrors show him objects close at hand. He also has the undistorted view of the flat mirrors to allow him to judge distance in the most vital areas.

Perhaps no problem of modern motor traffic is worth closer serious study than the operation of heavy trucks. Not only is life itself at stake, with all its aspects of public relations, but also the loss or damage to loads, delays that lose customers, and the litigation that may result.

After all, the eye is faster than the ear. It is no longer enough these days to see what's ahead; truck maneuvering requires that *all* angles be reasonably within range of the driver's eye.

For reference material on this topic, see *Truck Mirror Equipment —and Safety,* by L. Crouthamel, Box 186, Perkasie, Pa.

Proper Tire Care

(From page 118.)

Another need for maintenance is evident on most haul roads. In most off-the-road projects the haul road may only be the tracks of a preceding 'dozer or scraper. In any event, the surface is mighty important as far as the service life of the tires is concerned. Unnecessarily steep grades or sharp turns will increase tire slippage and result in fast abrasive wear. Imbedded or loose rocks increase the cutting and impact break hazards, and will decrease the speed of operating. Maintaining a good haul road will usually pay a big dividend in

(Continued on page 125.)

Tire tread is directional. Note that the left rear tire (center) is improperly installed; hence it will not be self-cleaning in operation.

TOUGH LOADING

Eimco Tractor Excavator in open pit mine. Loading capacity in this rugged rock pile is at the rate of 1500-1800 tons per shift per machine.

Eimco Tractors with Eimco excavating attachments are proved rock loading machines. This 1½ cubic yard tractor excavator has a digging force of 36,000 pounds at the bucket lip. Any other type of rock loading equipment of this capacity able to exert this digging force would require an investment of two to three times that of the mobile efficient Eimco loader.

Eimcos load faster (at the rate of 3 to 5 yards per minute in rock) even when working on uneven ground. They are easier to operate — only two small handles control all tractor movements and they are more maneuverable because they have independently controlled tracks so that one track can be run forward while the other runs reverse.

The Eimco Tractor mounts its loading attachment directly to the tractor frame inside the track assembly. This is a unique feature exclusive with Eimco. Only Eimcos have been designed with the superior strength to permit mounting attachments on the frame so that they will work longer than conventional tractors, with less down time and a minimum of maintenance attention.

Yes! The tough jobs can be easily handled by Eimcos. You can safely put them in against much larger, much more expensive equipment and watch them hold their own. In the job pictured above, where one bench of an open pit is being worked, the greatest difference is apparent in moving from bench to bench. The Eimco required four minutes. The larger, more expensive equipment requird half a day with all hands pulled off their drilling, shooting and dozing jobs to help.

Investigate the Eimco Tractor and its loading attachment. It will show you new ways to cut costs — be low on the next job.

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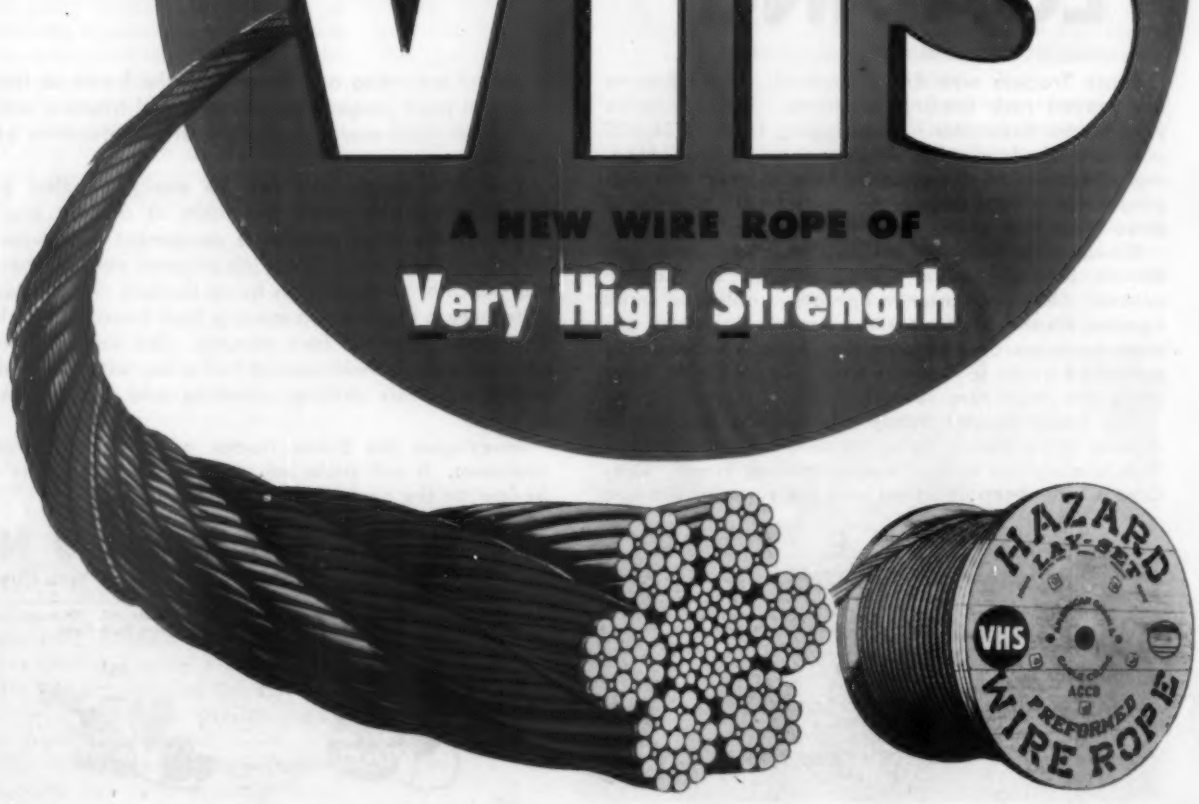

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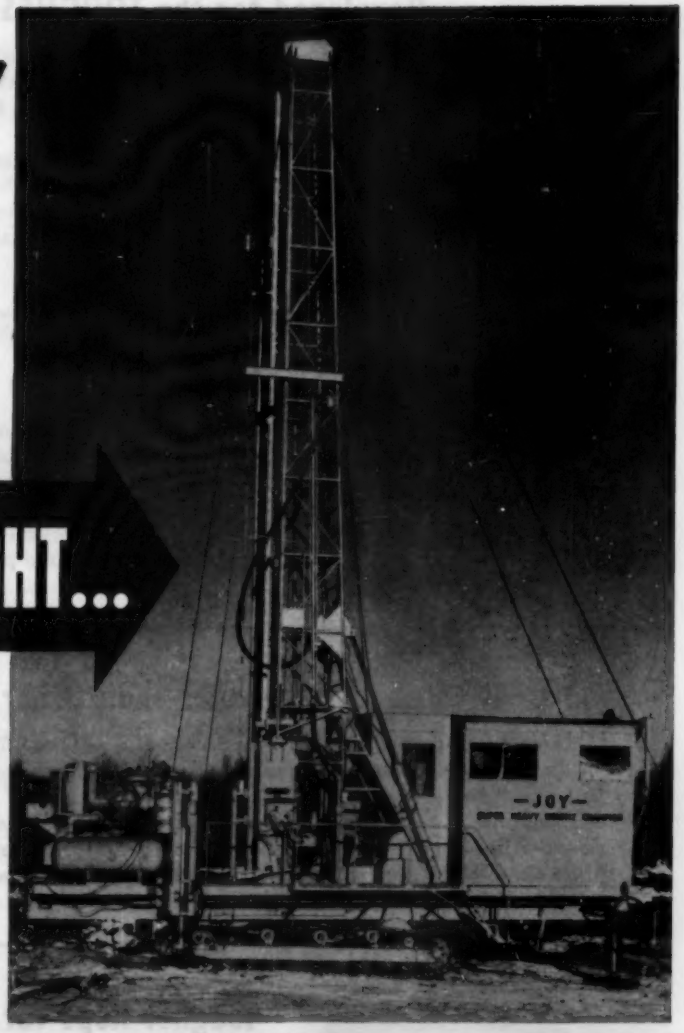

Here is the new, *larger,* heavier Joy Champion Rotary Blasthole Drill . . . the "big brother" of the Middleweight and Heavyweight Champions, the Joy drills which pioneered revolutionary rotary-air blast drilling. It is designed specifically for large (9″ to 12″) hole-drilling in harder rock.

Proof of its ability to tackle the toughest open cut mining and quarry jobs is the record of the unit illustrated. This Super Heavyweight has been performing very satisfactorily in the hard taconite formations of the Minnesota Iron Range.

The Super Heavyweight is a rugged, heavy duty, low maintenance machine, built to last and produce. Write, now, for complete details to *Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa.* In Canada: *Joy Manufacturing Company (Canada) Limited, Galt, Ontario*

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DRILLS DRY . . . No freezing water lines, no costly water hauling.

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QUICK SETUP . . . *Hydraulically raised mast* and hydraulic levelling jacks.

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AMPLE WEIGHT . . . Enough to handle big 9″ to 12″ holes.

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MANUFACTURER OF ROTARY BLAST HOLE DRILLS

Developed for the TOUGHEST JOBS

Until very recently, certain confidential military applications have consumed almost all of our available production of LAY-SET VHS. However, since World War II a limited amount has been field tested in certain specific commercial applications.

Now you can get LAY-SET VHS for seven major uses—for scrapers, bull-dozers, drag lines, shovel hoist ropes, logging arch lines and chokers, rotary drilling lines and slushers. These applications are among the toughest wire rope has to meet. The unusual demands they make on wire rope dictate the use of VHS.

Costs Less to Use

Because it lasts longer and cuts "down time" for replacement, VHS wire rope costs less to use. It increases work output. Since it is stronger and tougher, it reduces the footage of rope you need to buy to operate your equipment.

Carefully kept service records on actual field tests in the applications mentioned above prove the greater economy of LAY-SET VHS.

At Least 15% Stronger than Other Grades

VHS is a new grade of steel for wire ropes. It is at least 15% stronger than Improved Plow Steel, which up to now, has been the strongest standard grade of wire rope manufactured.

This means that in some applications you may be able to use smaller lines to carry the same load. In other applications you may be able to carry heavier loads with lines of the same size.

Tougher Rope for Longer Life

In addition to being stronger, the new VHS wire is tougher and more wear-resistant. It offers greater resistance to abrasion. It keeps its shape under pressure . . . can't become "hide bound" or lose its flexibility.

This extra toughness and wear-resistance means longer service life . . . and less "down time" of equipment for rope replacement.

Biggest Improvement Since LAY-SET Preformed

LAY-SET VHS is the greatest improvement in wire rope since ACCO introduced Preformed over thirty years ago. It combines greater strength and toughness with all the advantages of Preformed construction. As proven in actual field tests, it lasts longer and does more work with less "down time" for replacement.

Find out how you can reduce service costs by using LAY-SET VHS on all of the applications mentioned above.

See your Hazard distributor or write to the nearest office listed below for brochure DH-490.

HAZARD WIRE ROPE DIVISION
American Chain & Cable Company, Inc.

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Kentucky Stone Producers Hold Annual Meeting

Directors of the Kentucky Crushed Stone Association, front row: R. S. Waters, W. O. Snyder, Margaret McD. Smith, Emil Berry, and J. R. Thompson; rear row: Herman Genet, Herbert Wells, David Bassett, J. B. Allen, Marlon King, and George Geohegan Jr.

At the annual meeting of the Kentucky Crushed Stone Association, held March 12 at Louisville, J. Robert Thompson of Frankfort was elected president. Emil Berry of Anchorage was named vice-president. Other officers were Margaret McD. Smith of Lexington, treasurer, R. S. Waters of Elizabethtown, secretary, and W. O. Snyder of Frankfort, executive secretary—all re-elected for 1955. James B. Allen of Winchester, retiring president of the association, became an ex officio member of the board.

Jules Jenkins of Chicago, president of Vibration Measurement Engineers, one of the major speakers on the program, discussed phases of human response to blasting vibration. He considered the mental attitudes which affect persons in the vicinity of blasting operations, as well as the actual physical response. By means of slides he showed seismographic measurements of blast vibrations in holes of varying spacing and depths, and also of various loadings. Mr. Jenkins stated that data obtained by scientific seismographic research on blast vibrations had saved companies thousands of dollars in claims of damage to buildings.

He declared that the crushed stone industry must undertake to combat the firmly-entrenched ideas held by the public; operators must stress the fact that the benefits obtained from crushed stone operations (in which blasting is indispensable) far outweigh the unjustifiable prejudices concerning blasting practices. He added that such a program of enlightenment must be undertaken on an association level.

Joe Gray, field representative of the National Crushed Stone Association, and Samuel Omasta, representing the National Agricultural Limestone Institute, Inc., discussed industry affairs on the national level.

In line with the usual procedure, officials of the Kentucky Department of Highways participated in a discussion of specifications, gradations, and other matters affecting the production and use of highway stone. Among the items discussed were a new specification changing some gradations, and an apparent decision to eliminate the use of stone sand from Class I bituminous concrete surface courses. Surface slickness reportedly caused by the use of stone sand was given as the chief reason for this change. However, several producers claimed that if gradations are in proper proportions, such slickness can be avoided, regardless of the type of sand used.

The following members were elected to the board of directors: Sam Nally of Bardstown, R. A. Matthews of Louisville, Herman Genet of Greenville, George Geohegan Jr. of Bardstown, Marlon King of Canton, and Herbert Wells of West Liberty.

J. Robert Thompson, newly-elected president of the association.

Emil Berry, elected vice-president at the annual meeting.

Proper Tire Care

(From page 120.)

longer tire and vehicle life.

It is recommended that operators develop the habit of inspecting tires for loss of air pressure and for damage. Punctures and slow leaks may develop at any time. It is necessary to keep valve caps on tubes to prevent dirt from getting into the valve; and valve cores should be replaced whenever they show signs of leaking. Oil or grease should be promptly wiped from the tires.

An operator who is constantly aware of the cost of replacement tires can be a big help in reducing replacement costs. He can do this in two ways: (1) by following the maintenance practices suggested here, and (2) by operating wheel equipment in such a manner as to achieve "better than average" tire life. Tire life *can* be extended. It takes a little work, but it's worth it!

Report on Current Labor Developments

Are They Really Asking for a Guaranteed Annual Wage?

By S. HERBERT UNTERBERGER

S. Herbert Unterberger and Company
Industrial and Labor Economists
Washington, D. C. - Philadelphia, Pa.

This report on developments with respect to guaranteed annual wages is of vital importance to every employer of union labor. Greater income security for their members is being demanded by unions, and every industry will sooner or later be affected. Mr. Unterberger is especially well qualified to discuss this subject and advise on it. He is currently consulting with both industrial and banking institutions on guaranteed wage problems. He has lectured on this subject at the University of Pennsylvania, the Industrial Relations Research Association, and the Federal Mediation and Conciliation Service. He was also a principal staff member of the United States Government's Guaranteed Wage Study.—The Editor.

NOW that the guaranteed annual wage has finally moved from the arena of public debate to the bargaining table, it is appropriate to inquire — even belatedly — "What are they really asking for?"

The words "guaranteed annual wage" conjure up a picture. To the average worker the picture is one of the good life—in which, at least for a year, the fear of a substantial reduction in income due to no fault of his own is eliminated. To most employers the picture is a morbid one—in which, for at least the same year, they will be saddled with a large irreducible labor cost, even if the business is not there to support it.

To arrive at these conclusions, both workers and employers have very logically concluded that the words "guaranteed annual wages" mean exactly what they say; namely, that for the period of a year each employed worker is guaranteed his regular wage. If paid weekly, this would involve a guarantee of 52 consecutive pay checks—none of which for an amount less than he would receive for working the regular number of weekly hours.

Are they really asking for such a 100 percent guarantee of annual wages in the automobile industry, where the demand is now being pushed most strenuously? The answer is, "No."

Nor, for that matter, do the guaranteed wage plans which have been in operation for some time—several of which have received much publicity—generally provide such an all-inclusive, 100 percent guarantee.

No discussion of this subject is complete without some reference to the "big three" of guaranteed wage plans—those in operation at the Procter and Gamble Company, soap manufacturers; Nunn-Bush Shoe Company, shoe manufacturers; and the Geo. A. Hormel Company, meat packers.

The Procter and Gamble plan falls far short of a 100 percent guarantee of annual wages since it covers only hourly paid employees who have completed two years of consecutive service; it guarantees to them only the equivalent of 48 weeks of employment; and the company retains the right to reduce that amount or even modify or terminate the plan at any time.

The question has often been raised as to whether the Nunn-Bush plan should be regarded as a guaranteed wage plan at all since it really guarantees no specific amount of wages or employment. It merely guarantees that, if the plant operates, the covered workers (a relatively small group wtih the greatest seniority) must be employed and receive pay. But the amount of the pay is not fixed; it is related to the value of the shoes produced. It has earned the reputation of being a guaranteed wage plan because in actual practice the plant has operated continuously; and not only the covered workers but also a larger group (those with two years' service) have received pay checks each week although the amounts of those checks have varied from time to time.

The Hormel plan comes closest to a 100 percent guaranteed annual wage since it covers every production and maintenance worker and guarantees them a pay check each week of the year amounting to at least their hourly rate times the number of hours in their standard work week (38 hours for most of the employees). On the other hand, in return for the guarantee, the workers have given up many valuable overtime privileges. Because the plan qualifies for a special exemption under the Wage-Hour law, an employee may be required to work longer than his standard hours during a work week without any extra pay. (Previously, employees received time and one-half for hours worked in excess of 40 in any week. Under this new agreed-upon arrangement, he receives such premium pay only for hours worked in excess of 53 in any week, or in excess of 48 in any week in which he worked more than 10 hours in a single day.)

Of the other known guaranteed wage plans, only a small proportion make 100 percent guarantees. For the most part, they are found in small establishments in relatively stable industries, where the required employee complement is least likely to change quickly.

Thus, if the unions were now asking for plans like those operating at Procter and Gamble, Nunn-Bush, or Hormel, they would be asking for something less—probably a great deal less—than the complete and unequivocal guarantee of annual wages which many members want.

As a matter of fact, the unions in the mass production industries—steel, automobile, aluminum, and electrical manufacturing—where the demand has been pushed and is being pushed most vigorously, are asking for something quite different.

Although the union in the steel industry is not currently pressing its demand because it has no open contract, it has not retreated from the supplemental unemployment compensation program which it proposed in 1951. That program would have required every steel company to contribute a certain number of cents per hour to a trust fund out of which all laid-off workers with three years' continuous service would have been paid the difference between their unemployment compensation benefits and 30 times their hourly wage rate up to a maximum of 52 consecutive weeks. This proposed program included no special incentive to stabilize employment, probably because it was recognized that steel producers could exercise very little control over the demand for their product. Thus, they reasoned that income security was achievable only by adequate payments during periods of involuntary unemployment.

The union in the automobile industry, which started late in the race for guaranteed wages, primarily because it was tied up with a five-year contract, had now taken the lead. The union's proposal incorporates the supplemental unemployment

(Continued on page 148)

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Wet Cyclones, Circular Screens Process

CALIFORNIA SILICA SAND

Flotation department being added this year to increase output of low-iron glass sand

ON THE SPOT report

CRYSTAL Silica Company has been mining and processing silica sand from a deposit east of Oceanside, Calif., since 1928. The company has progressively revamped its processing setup in recent years, at the same time continuing to increase production capacity. Within the last year or so it has installed a battery of eight wet cyclone separators to deslime and attrite the sand on the wet side. It has also increased screening capacity and efficiency by the addition of several more circular-type vibrating screens on the dry side. Currently it has a total of 19 of these double-deck Sweco separators in service, the largest modern screening installation of its type in the industry. Capacity of the plant at present is about 50 t.p.h. wet and 30 t.p.h. dry finished product.

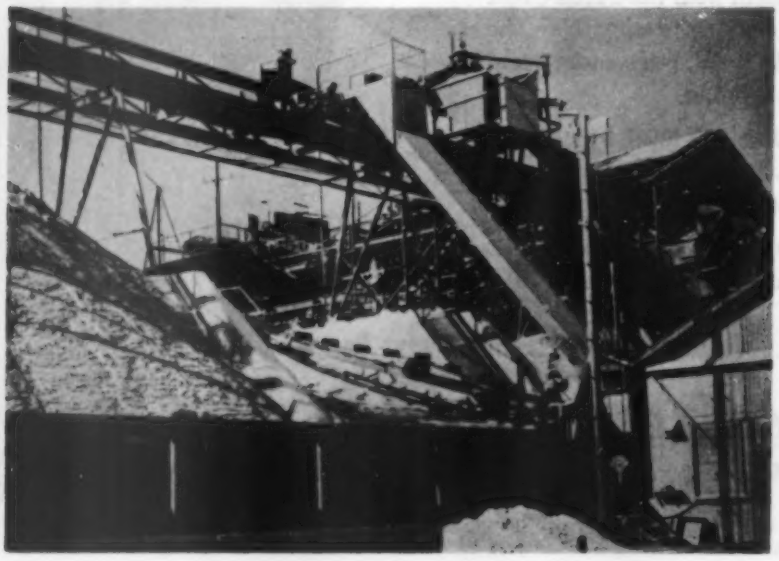
Pilot-plant operations are being started this spring to develop a flotation circuit; and a full-scale froth-flotation department is expected to be in operation by the end of the year, principally to step up the output of glass sand. The cell arrangement is being designed to eliminate iron-bearing heavies and to separate the quartz and feldspar fractions to a greater degree than is possible at present. The glass-container industry has more than doubled in California in the last eight or ten years, and this type of flint sand is in particular demand.

The Crystal Silica deposit consists of horizontal to gently-dipping loosely-consolidated sandstone of the Eocene Tejon formation, with the layers of desired material separated by silt and clay lenses. The sand is mostly pure quartz and contains moderate amounts of altered feldspar. Biotite occurs in minute flakes as the principal iron-bearing mineral. By means of a core-drilling program undertaken just recently in co-operation with Southwestern Engineering Company of Los Angeles, reserves of at least 9,000,000 tons were disclosed in the lands under lease. Much of the plant output is specialty sand, particularly sand aggregates for stucco. Glass-sand output is expected to increase sharply after the flotation department gets into production.

Five grades of finished sand are produced, abritrarily designated as No. 12, No. 16, No. 20, No. 30, and No. 60. The coarsest, No. 12, is minus 10- plus 16-mesh; No. 16 is minus 12- plus 35-mesh; No. 20, minus 16- plus 40-; No. 30 (glass sand), minus 30- plus 100-mesh; and No. 60, high in alumina, is 50-mesh down to pan.

After stripping, the sand is dug and hauled by Terracobra scrapers, the present haul being about 1½ miles. From the plant hopper the material is put through a trommel scrubber (to take out clay waste), followed by a pair of revolving screens. In the washing (or wet side) circuit are two 60-ft. scrubbers, two sand wheels, three propellor-type agitator tanks, and six rake classifiers operating in series to wash the sand thoroughly and abrade it, scour it and bring it down to grain size.

The eight Krebs wet-cyclone separators were installed about mid-way in the washing circuit in 1954. These 10-in. integral 2-stage units, made by Equipment Engineers, Inc., of San Francisco, are arranged in two sets of four. Underflows from the first set,



One section of the Crystal Silica Sand Company's plant at Oceanside, Calif. After the washing operation the sand is stored for drainage before being dried and sized.

after more scrubbing and agitating, are pumped to the second set before the final underflow product goes on to the rakes.

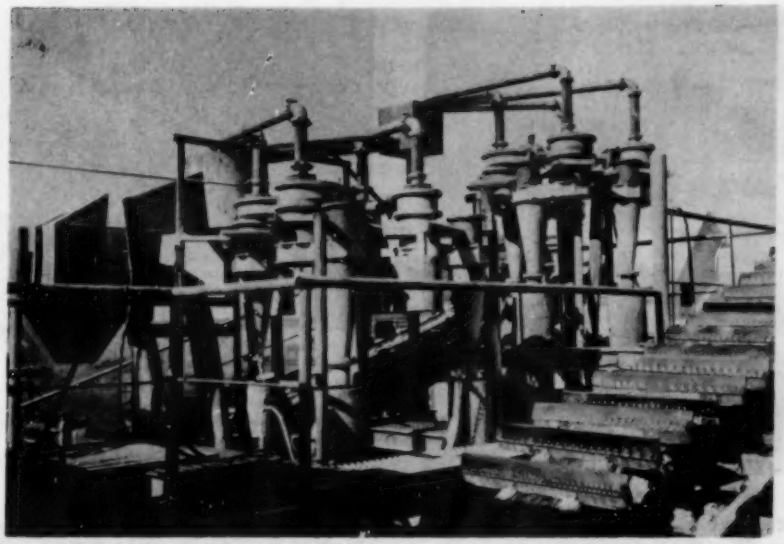
The objective of the cyclones—to deslime, attrite, and reject the extreme fines—has been more than realized in performance. The units operate under pressures of about 18 p.s.i. With an average feed of 188 g.p.m. per unit (32 percent solids), rejection of minus 200-mesh fines *via* the overflow is about 99 percent. Currently, however, the management is finding it more desirable to control the rejection below 100-mesh and to recycle the overflows. It has also been discovered that these units will operate even more efficiently if the feed contains little or no material coarser than 12-mesh, and it is planned soon to install screens ahead of the cyclones to by-pass the plus 12-mesh particles.

Capacitywise, three or four cyclones 20 in. in diameter could classify and deslime the same tonnage as the eight 10-in. units. However, since the desired attrition is much greater using a larger number of smaller units, the present arrangement was chosen. The cyclones are fitted with replaceable, molded gum rubber liners to resist wear, the sharp, angular quartz particles being, of course, highly abrasive. Slurries are handled by three Vacseal 4-in. rubber-lined pumps. The clean, partially dewatered sand is finally conveyed to a 3-compartment 1,500-ton storage bunker for drainage and surge-storage.

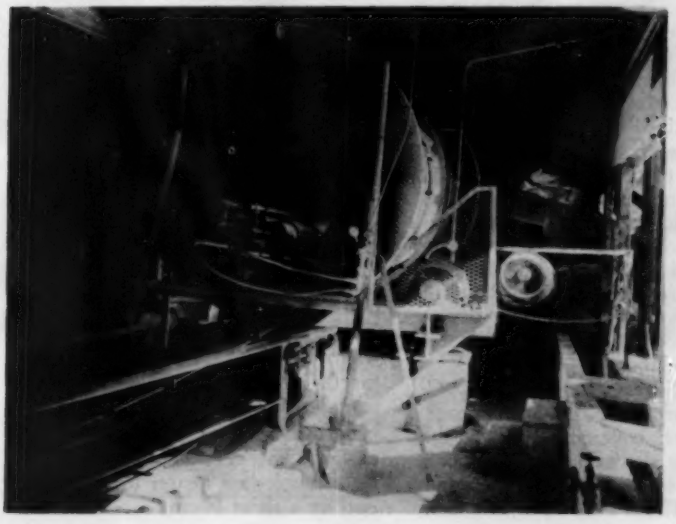
Extensive provision has been made for saving, cleaning, and re-using the limited quantity of water available for washing the sand. A series of five settling ponds with a combined capacity of nearly 10,000,000 gal. accomplishes this reconditioning. The plant's requirements of 1,100 g.p.m. are taken from the final and lowest pond, where fresh supplies from the mains of the Oceanside municipal water system are added for make-up.

From the drainage bunkers the damp sand is conveyed to either or both of two direct-heat, propane-fired rotary driers, one 8 by 35 ft., the other 5 by 45 ft. in size. After drying, the sand goes on to the screening circuit and the rotary impact mills. There are 7 of these company-designed closed-circuit mills in which coarser particles are broken down by peripheral impact against a Ni-Hard alloy outer ring. Since the spar fractures on impact more readily than the crystalline quartz, control of the iron and high-alumina fractions can be maintained to a considerable degree by screen sizing.

Originally the screening department employed the old "slugger" type of vibrating screens. These have all gradually been replaced with Sweco separators, a product of Southwestern Engineering Co. These 48-in. circular, double-deck machines proved so efficient, particularly from the standpoint of sizing accuracy, lower power consumption, and long screen life that after the initial installation of 9 or 10 units a few years ago, the company decided to standardize on these screens. A total of 19 Swecos are now in service. With the exception of the pair of scalpers, all are fitted with stainless steel cloth. Main-



This view shows the battery of eight two-stage wet cyclone separators which deslime and attrite the sand. The units are lined with gum rubber liners to resist wear.



One of the two propane-fired rotary driers used to dry the washed sand.

A dismantled impact mill—one of seven in the plant. The impact ring (above) is extremely resistant to wear.

Three views showing a few of the 19 circular vibrating screens installed in the plant. The 48-in. double-deck units operate dry, and they size five market grades of sand from 10- to finer than 100-mesh. Although the sand is extremely sharp and highly abrasive, the stainless steel cloth has an average life of 8 months.

tenance has been much lower than anticipated, and cloth life averages about 8 months!

The Sweco scalpers reject any plus 5/16-in. pebbles from the circuit, the accumulation being disposed of periodically to a nearby concrete block plant. The first set of seven Swecos make No. 30 and No. 60 products. The following pair of the circular screens serve mainly as circuit balancers and provide feed to the impact mills. The next set of four Swecos yield No. 16 and No. 20 finished product, and either No. 12 product or impact-mill feed. The final set of four sizers carries the same cloth complement as the first set of seven in the sequence to separate No. 20, No. 30, and No. 60 product.

Most of the finished sand is bagged, although increasing tonnages are being shipped in bulk, either by truck or by rail. (The plant is served by a branch of the Sante Fe Railroad.) As recently as 1952, the management reports, only 2 percent of the output was shipped in bulk; today 25 percent is unpackaged.

Crystal Silica is the only active commercial producer of silica sand in southern California. (One other plant, near Corona, Calif., is owned and operated by a glass manufacturer whose output is largely captive tonnage.)

Wayne B. Harper, who is now president, joined the original company soon after it was formed in 1928 as sales manager, assuming control shortly before World War II. His son, Richard K. Harper, has the present title of sales manager, although he is also closely identified with production and administrative problems. W. T. Borden is chief engineer, and J. C. Kite is plant manager.

Main offices, sales headquarters, and warehouses are maintained in Los Angeles. Shipments are made throughout southern California, although some of the product goes as far north as the San Francisco area, and some into Arizona.

Iowa Agstone Meeting

(Continued from page 105)

Floyd Andre, dean of agriculture at Iowa State College, chose the subject *Meeting the Challenge* to list the accomplishments of the farmer in attaining his present position, that of a substantial business man. He said that while the present 59 percent urban ratio of population continues to increase each year, resulting in a correspondingly lower percentage of farmers, more real progress has been made in efficient farm production in the last ten years than was made during the 100 years preceding this decade. He declared that the country's 7,000,000 farmers are now taking better advantage of their opportunities to produce greater yields. To prove this statement he cited some 700 farms in Wisconsin where the yield of corn, which averaged only 42 bu. per acre ten years ago, now stands at 106 bu. per acre.

In an inspiring and thought-provoking address, Kenneth C. Thatcher, secretary of the Iowa Farm Bureau, described his experiences on a recent tour of Europe in company with 70 Iowa farmers. They talked with many people, mainly farmers, in several countries; and he felt that they heard truer expressions of opinion than would the average American tourist on such a trip. He made the following points: the European farmer is getting better yields than are produced here; by European standards these farmers are very prosperous; low-cost hand labor used on farms does not approach the accepted standards of machine production we take for granted; excellent re-building of devastated farm areas has been accomplished. He felt we should be glad that labor is not cheap here, as it would not be good for the people, and we would be likely to waste it, as is now being done in Europe. Prosperity he said, is dependent upon what is produced, not upon cheap labor.

Eugene Severs, partner in J. C. Addison and Company, accountants, Des Moines, covered many of the questions in the minds of producers in his talk, entitled *Don't Let Income Taxes Deplete Your Profits.* Two basic considerations govern the success of any business, he declared: (1) the basic efficiency of the operation and (2) the maintenance of proper relationships within the organization. He reviewed the four basic changes in the 1954 tax law which are significant to the producer of materials, and reminded his listeners that *profits*—not volume—should be the end endeavor of any business.

The associate members took over the management of the convention for the remainder of the evening, by sponsoring a reception, a buffet dinner, and a dance, attended by over 300 persons.

The Laresen Sand & Gravel Company, Neenah, Wis., sustained a $25,000 to $30,000 loss on February 19 when the firm's new building was razed. This followed by ten days the completion of the building which had been destroyed by a fire three weeks earlier. The first blaze was caused by an exploding heater unit, the second by a short circuit.

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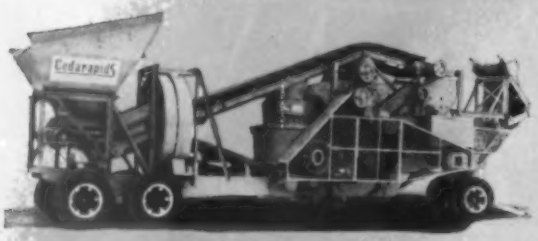

***NEW* CONE CRUSHER SECONDARY** combines the great mobility of Cedarapids portable design with the high capacity and low-cost operation of Symons® Cone Crushers. The result is big-volume finished crushing of even the hardest or most abrasive rock or gravel to uniform, finely crushed aggregate.

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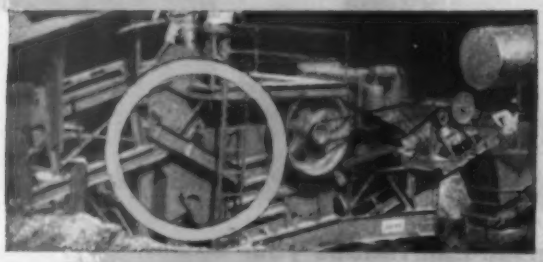
COMMANDER PLANT, now built with a big, new Cedarapids 30"x25" Roll Crusher to step up secondary crushing capacity by 12%, turns out *even greater* tonnages of finer-sized aggregate than before . . . *and at the same cost per ton!* The design ratio of the 1036 Jaw Crusher, the new 3025 Roll Crusher, the big 48"x10' Horizontal Vibrating Screen, and the 30" wide Conveyors is the secret of the Commander's high capacity.



PORTABLE PRIMARY with Vibrating Grizzly, which by-passes most of the undersize material and fines, increases primary output up to 25%, and greatly decreases jaw crusher wear per ton of production. Vibrating Grizzlies step up production in any pit or quarry, but are particularly effective wherever the percentage of fines is high.

GET COMPLETE DETAILS FROM YOUR CEDARAPIDS DISTRIBUTOR

The Cedarapids Line of Equipment Includes:

PORTABLE AND STATIONARY CRUSHING, SCREENING AND WASHING PLANTS FOR STONE, GRAVEL AND SAND • BELT CONVEYORS • VIBRATOR AND REVOLVING SCREENS • FEEDERS • HAMMERMILLS • DOUBLE IMPELLER IMPACT BREAKERS • BATCH TYPE AND CONTINUOUS FLOW TYPE BITUMINOUS MIXING PLANTS • DRIERS • DUST COLLECTORS • VIBRATING SOIL COMPACTION UNITS • MOTORIZED HEAD PULLEYS

Built by Iowa . . . Sold the World Over

Assure your share of the coming highway boom!

In the Cedarapids line of aggregate producing and bituminous mixing plants, *there's a type and size of equipment to meet every specification requirement, every operating condition* for the big job ahead of the Highway Construction Industry.

With Cedarapids in your future, you can combine high production with low operating costs for out-sized profits on your share of future contracts!

FOR EVERY BITUMINOUS MIXING JOB

MODEL G60 6000-LB. PLANT is the answer to meeting today's big market demands for asphaltic concrete. The Model G60 produces 3 or more tons at a batch . . . with fully automatic controls, it turns out 180 tons, or more, per hour! Built-in running gear on each sectionalized unit makes transportation easy. Simple, self-contained erection device assures quick set-up.

MODEL G40 4000-LB. PLANT is a new Cedarapids plant designed with every "plus" detail of the bigger G60. Write for a full description of every money-making feature of both sizes.

***NEW* MODEL H15,** a batch-type plant designed for medium sized bituminous paving jobs with capacities ranging from 35 to 60 tons per hour, depending on job specification requirements. This stack-up, tower-type plant is simple to erect, as each section is a self-contained unit.

MODEL CM "COMMERCIAL" MIXER is a money-maker that can't be beat for profitable commercial jobs such as surfacing city streets, driveways, parking lots, playgrounds, tennis courts, etc. This continuous-flow type plant can be used alone to produce cold mix, or with a Cedarapids Drier and Gradation Control Unit for hot mix or high type asphaltic concrete. For bigger jobs, the Cedarapids Master Plant is available.

IOWA
MANUFACTURING COMPANY
Cedar Rapids, Iowa, U.S.A.

IOWA MANUFACTURING COMPANY, Cedar Rapids, Iowa, U. S. A.

Gentlemen: **My next job is**_____

_____

_____

☐ **Please send details of the Cedarapids equipment you recommend.**

Name_____

Title_____

Company_____

Address_____

City_____ **Zone**____ **State**_____

Cooley's New Plant

(From page 83.)

cavated. At the North Denver plant the deposit is worked in parallel strips, and the overburden is cast back into the pit by the dragline during the slack winter season. At the South Denver plant the waste material is being pumped back into the pond in strips, providing land between lakes.

Most of the equipment in the company's three sand and gravel plants is owned by Cooley Brothers, a partnership of C. G. Cooley and L. M. Cooley, and leased to the Cooley Gravel Company. Officers of the last-mentioned firm are: C. G. Cooley, president and general manager; L. M. Cooley, vice-president; and Dave Hughes, secretary-treasurer. E. J. Wemlinger is general superintendent, Orville Enderud is chief engineer and superintendent of the North Denver plant; and Morgan Williams is superintendent of the South Denver plant. F. M. Graham is sales manager.

DOES DOUBLE DUTY

The EAGLE 36-42 HAMMERMILL

Why buy both primary and secondary crushers when this carefully engineered, sturdily built Eagle will answer for both? Its fast flying, super-hard hammers chew right into all comers — anything that will enter the feeder opening. Turns out any size aggregate, according to the setting, from dust to 3" stone. Unsurpassed for ag-lime production.

Look at EAGLE before you buy!

Send for complete specifications, Folder 251-168

EAGLE CRUSHER CO., Inc. GALION OHIO·U·S·A

JAW CRUSHERS · IMPACT BREAKERS
PULVERIZERS · CONVEYORS · LOADERS

A.I.M.E. Convention

(From page 93.)

ical Corp. of America, gave a paper entitled *The Requirements of Modern Paper Clays*. He said that the manufacture of grades of paper consuming large quantities of filler and coating clays has been substantially revolutionized during the past twenty years. The new high speed methods are notable for their very exacting demands as to the properties of coating and filler clays. Inasmuch as the paper industry is the largest consumer of kaolins, these developments have, of necessity, brought about method changes in the kaolin industry in order to satisfy the requirements.

An interesting paper was given by C. H. Pratt, Cabot Minerals Division, Cabot Carbon Co., on a still relatively new mineral. His paper *Quality Control of Wollastonite*[5] was presented to encourage discussion by other producers and consumers in the continuing search for better and more standardized quality control procedures.

Wollastonite (calcium metasilicate, $CaSiO_3$) is a unique addition to the field of finely ground nonmetallic minerals commercially available for use in paint, plastic, ceramic, and other applications.

Ten years ago the first A.I.M.E. paper appeared on the extensive wollastonite deposit at Willsboro, N. Y. Since then, Godfrey L. Cabot, Inc., has gained pilot plant and plant experience in crushing, beneficiating, and grinding this new mineral, and test procedures have been established for both process and product quality control. In attempting rational comparisons among competitive materials, the need for better standard control tests for fine particle size became evident. These tests included top particle size, average size, particle distribution, etc.

Mr. Pratt observed that, as in all quality control work, the essential requirement was speed at a satisfactory level of accurcacy and reproducibility using unskilled operators and a minimum of complex apparatus. Control methods for many different materials were investigated and standard samples were exchanged with other control laboratories as a basis for comparing test data. Mr. Pratt explained many variations encountered and how the best features of each were combined into simple, standard procedures.

(Continued on page 148.)

[5]For a description of the Cabot Carbon Wollastonite plant, see PIT AND QUARRY, Dec., 1954, p. 52 (Ladoo, Raymond B.—*Wollastonite—a New Industrial Mineral*).

More Information, Please

Use the prepaid postcard to get this literature or additional details about new equipment and products reported elsewhere in this issue.

BRAKE COSTS can be greatly cut is the topic of this booklet put out by *Grizzly Mfg. Division*. Valuable suggestions for reducing maintenance costs while increasing drum life and brake safety are included. (1)

BOILER REFRACTORIES are discussed in this bulletin of the *Refractories Division of The Babcock & Wilcox Co.* It covers the importance of selecting the proper refractory materials and the basic requirements they must meet. (2)

TANDEMS by *Reo Motors, Inc.*, are described comprehensively in this pamphlet. Seven series are covered with details on the unit-mounted air brakes, hypoid-helical final drive, and the tandem-frame hook-up which needs no lubrication. (3)

AN EXCAVATOR-CRANE, the Hystaway, made by the *Hyster Co.*, is a versatile unit which combines ruggedness and mobility. Mounted on new or used Caterpillar D6, D7, or D8 track-type tractors, it can be quickly converted to shovel, backhoe, dragline, crane, clamshell, or pile driver. (4)

WIRE ROPE having 15% greater strength without the usual proportionate decrease in other desirable qualities is now being offered by *John A. Roebling's Sons Corp.* The new rope has higher resistance to wear from bending and abrasion, and has been proven on-the-job for several years. (5)

HYDRAULIC SCRAPER manufactured by *Henry Mfg. Co., Inc.*, is of all-steel construction with electric-welding throughout. It has rear dumping action, deep soil-penetration at all angles, and a self-cleaning bowl. Available in 1¼- and 2-cu. yd. capacities, it employs pneumatic tires. (6)

CONVEYOR PULLEY catalog listing the development of and improvements in American conveyor pulleys made by *The American Pulley Company* is now available. Design features that go into making these pulleys "built for the belt", and complete dimensional tables are included. (7)

A COOLING SYSTEM is just as important to an internal combustion engine as the lubricating, fuel, or air systems according to this publication offered by the *Cummins Engine Company, Inc.* It contains many helpful suggestions on the best way to care for an engine's cooling system. (8)

CONTINUOUS GRINDING with ball, tube, and rod mills made by *The Patterson Foundry and Machine Co.* is covered in this booklet. It includes interesting discussions on such subjects as open and closed circuit grinding, and dry and wet grinding. Various blueprints are included which show applications of the machines. (9)

WORM GEAR MOTORS for horizontal or vertical drive are the subjects of this catalog offered by the *D. O. James Gear Mfg. Co.* The motors have a ratio range from 5.66:1 to 100:1. (10)

NEW DEPRECIATION METHODS are explained in this brochure offered by *The Jaeger Machine Co.* It shows the various methods of computing depreciation, their relative advantages and limitations as well as typical examples and comparisons. (11)

CLINKER BREAKERS for use with the Air-Quenching clinker coolers have been added to the line carried by *Allis-Chalmers Mfg. Co.* A labor-saving device, the breaker is designed to crush chunks of clinker discharging from the cooler, using the repeated impacts of the cooler's reciprocating motion. (12)

TRACTOR LUGS that bring new efficiency and longer track wear are the claims for Grip-Lugs made by *Allied Steel & Tractor Products, Inc.* Sizes are available to fit any track-laying or crawler type equipment. (13)

SAFE FILTERING of lubricating oil is the topic of this booklet put out by the *Caterpillar Tractor Co.* It discusses the risks of "short cuts" in oil filter systems and the importance of using a filter made for your engine. (14)

HOSE CLAMPS, tools, and fittings are described in this catalog of the *Punch-Lok Co.* The Punch-Lok clamp is a broad, flat, double-wrapped band of high-tensile steel that is securely held together by punching the bands together and thereby nesting them tightly. (15)

PAINTING HOT SURFACES is easy when using Sili-Kool made by *C. H. Dragert Company, Inc.* It is also highly resistant to damage caused by heat, rust, and corrosion. It withstands 1600 degrees F. and exposure to extreme weather conditions. (16)

A DUMP BODY made by *The Heil Co.* of 2 cu. yd. capacity and up is the subject of this bulletin. The Heil SL-11 body features V-section-braced sides for full capacity loads; solid, one-piece corner posts; and a reinforced, box-braced tailgate. (17)

VIBRATING SCREENS for all medium and heavy-duty uses are in this catalog

FIRST CLASS
PERMIT NO. 44
(Sec. 34.9 P. L. & R.)
CHICAGO, ILL.

BUSINESS REPLY CARD

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APRIL, 1955

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More Information, Please

Use the prepaid postcard to get this literature or additional details about new equipment and products reported elsewhere in this issue.

by the *Link-Belt Company*. These screens have stress-relieved decks which are riveted to high-tensile side plates to form a completely integrated, rigid box assembly of from 1 to 3 screen decks. (18)

AIR HEATERS which are direct fired are described in this catalog of equipment offered by the Peabody Engineering Corp. Burners with designs for liquid fuels, scrubbers and coolers are also included. (19)

DRYING, SIZING, HEAT treatments are the topic of this booklet by *Dorr-Oliver Inc.* It describes the operation, advantages, theory, background, and typical applications of FluoSolids systems to this type of treatment and cites operating data from 2 drying and dedusting installations. (20)

CENTRALIZED LUBRICATION using the system evolved by *The Farval Corp.* is covered in this booklet. It stresses the importance of its use even in smaller machines with a limited number of bearings. It shows that as many as 12 bearings can be reached at one time from a single grease gun connection when using the Farval Multival. (21)

A TRANSIT CRANE of 15-ton rated capacity is the *Bucyrus-Erie* 15-B. This bulletin explains such features as easy convertibility of the ½ yd. unit, its powerful gasoline engine, and its 5-speed transmission mounted in unit with engine and 2-speed auxiliary unit mounted in truck frame which gives a combination providing 10 forward and 2 reverse speeds. (22)

SAND FILTER CLARIFIERS made by the *Hardinge Company, Inc.*, are described in this brochure. The firm's line of circular sand filter-clarifiers consists essentially of a spiral rotating scraper suspended at the tank center, which takes a cut from the surface of the sand bed when the filter rate decreases. (23)

GEAR SELECTION is greatly facilitated by use of this manual by the *Foote Bros. Gear and Machine Corp.* All standard gear sets available are listed by center distance and capacity. (24)

ARMORED MOTORS made by the *General Electric Co.* are compared in this bulletin with other such equipment. It also provides information of performance and maintenance features of the heavy-duty G-E motors. The motors contain extra-large commutators which withstand heavy overloads without overheating. (25)

BELT CONVEYORS. The *Mid-West Conveyor Co.* specializes in the installation of conveyors which increase efficiency of production by using their ingenious systems. This folder shows how they solved some intricate material transfer problems of one producer. (26)

CAST STEEL SHEAVES incorporating an improved metal is covered in this brochure by the *Farrell-Cheek Steel Co.* It also contains information regarding the firm's complete wire rope fittings and accessories catalog. (27)

VARIABLE SPEED DRIVE. The *Cleveland Worm & Gear Co.* is now manufacturing a Speed Variator which is modeled after the famous Kopp Variator used all over Europe. Available in sizes from ½- through 10-hp., it has been materially strengthened to meet the exceptional demands of the American market. (28)

SCREW CONVEYORS and a complete line of accessories are included in this catalog offered by the *Fort Worth Steel & Machinery Co.* Employment of this type of conveyor enables the producer to transport cement, gypsum, lime, etc., at any angle including a true vertical. (29)

BELT FASTENERS and rip plates produced by the *Flexible Steel Lacing Co.* are made of two-plates with nut and bolt. The 2 teeth which are staggered on either side of the bolt distribute the pull on the belt. (30)

CARBIDE BLANKS. *Firth-Loach Metals Inc.* has just issued a catalog of its complete line of Firlomet cemented carbide blanks. Included in their selection are several auger bits, rock bits, and others for various types of mining uses. (31)

POWER UNITS made by *International Harvester Co.* are described in this catalog. The 18 heavy-duty machines listed range from 16.5- to 200-hp. They fall into 3 groups: 4-cylinder carbureted units, 6-cylinder carbureted motors, and diesel units, both 4- and 6-cylinder. (32)

WATER, WASTE TREATMENT are the specialities of *Hardinge Co., Inc.* This brochure shows details of construction and specifications for Hardinge circular clarifiers, up to 200 ft. diameter, and rectangular clarifiers with crane type scraping mechanism. (33)

APRIL, 1955

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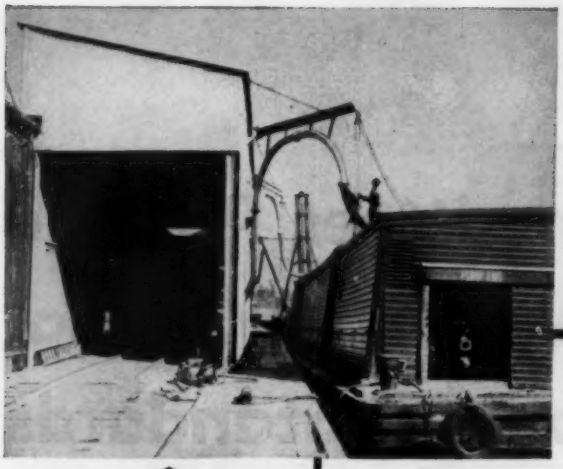
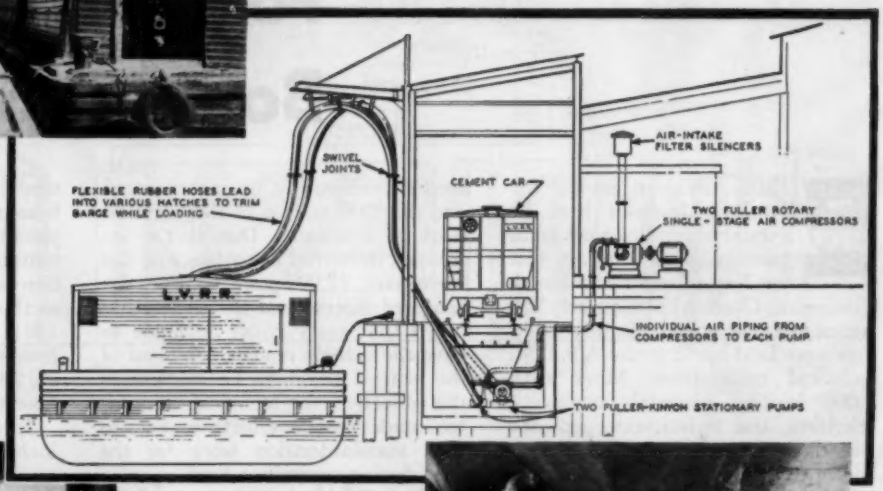
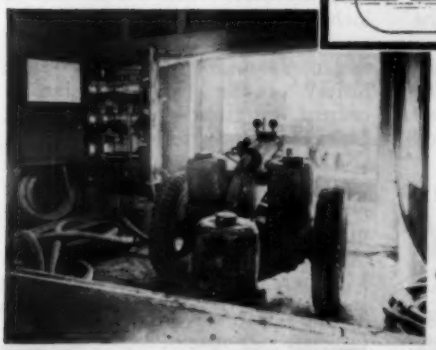


Hoses entering hatches of barge. Cement car in shed "spotted" over Fuller-Kinyon Pumps in pit. Fuller-Kinyon Unloader in doorway, end of barge.

Air does it...

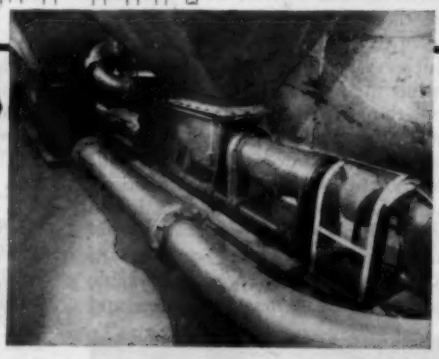
SPEEDIER
CLEANER
MORE EFFICIENTLY


AIR-INTAKE FILTER SILENCERS
SWIVEL JOINTS
CEMENT CAR
FLEXIBLE RUBBER HOSES LEAD INTO VARIOUS HATCHES TO TRIM BARGE WHILE LOADING
TWO FULLER ROTARY SINGLE-STAGE AIR COMPRESSORS
L.V.R.R.
INDIVIDUAL AIR PIPING FROM COMPRESSORS TO EACH PUMP
TWO FULLER-KINYON STATIONARY PUMPS



Two Fuller-Kinyon Stationary Pumps in pit. Pumps convey to barge at rate of 900-1000 bbl. an hour.

Unloader behind bulkhead in end of barge. At destination bulkhead is removed and unloader is propelled into barge, unloads cargo to storage on shore.



FULLER-KINYON SYSTEM unloads cars . . . conveys to barges . . . unloads barges for Lehigh Valley Railroad

In order to reduce the overall cost and speed up handling of bulk-cement shipments at its Jersey City terminal, Lehigh Valley Railroad engineers installed the Fuller-Kinyon Conveying System. Fuller-Kinyon Stationary Pumps convey from cars to barge, and Fuller-Kinyon Remote-Control Unloaders convey from barge to storage at various points in New York harbor . . . speedy, efficient, time-saving handling from the time cars arrive until final delivery to the consumer.

The pumps for unloading from cars to barge, convey through two conveying lines at rate of 900 to 1000 barrels an hour. The unloader has a rated capacity of 150 barrels an hour. One man operates and controls this machine by means of a flexible electrical cable and hand-control switch . . . start and stop, to right or left, forward or backward, wherever cement is to be picked up in the barge.

Air for the Fuller-Kinyon Stationary Pumps is supplied by two Fuller Rotary Compressors, each having a capacity of 614 c.f.m., at 12-lb. pressure. These compressors are installed on the pier adjacent to the car-unloading station.

If you are interested in efficient handling of bulk cement, write for Bulletins FK-20C and FK-27, illustrating and describing cement handling with Fuller equipment.

P-155
1389

DRY MATERIAL CONVEYING SYSTEMS AND COOLERS—
COMPRESSORS AND VACUUM PUMPS—
FEEDERS AND ASSOCIATED EQUIPMENT

FULLER COMPANY, Catasauqua, Pa.
GENERAL AMERICAN TRANSPORTATION CORPORATION SUBSIDIARY
Chicago • San Francisco • Los Angeles • Seattle • Birmingham

A.S.T.M. Committees Prepare For 1955 Triennial Book of Standards

ON THE SPOT report

THE American Society for Testing Materials held its annual committee week from January 31 to February 4 at the Netherland Plaza Hotel, Cincinnati, Ohio. Approximately 250 committee and sub-committee meetings were held by 32 of the A.S.T.M. technical committees. More than 1,000 leading materials engineers, scientists, and technicians spent the five days discussing and correlating the great amount of research on which A.S.T.M. specifications and testing methods are based. In addition, the several committees put into final shape new and revised tentatives and standards, which they will recommend to the Society for adoption at its annual meeting in Atlantic City in June.

A particularly large amount of work was done this year to enable many standards, new tentatives, and needed revisions to be incorporated into the 1955 edition of the triennial *Book of Standards*. Due to the increasing industrial importance of this seven-part, 11,000-page volume, the board of directors of the society has urged that every effort be made to have the volume ready by the end of the year if possible. To implement this objective, the technical committee made special efforts to act on their standardization work for the year during committee week.

R. S. Boynton, N.L.A., secretary, Committee C-7 on Lime.

The following is a summary of the actions taken in Cincinnati by the committees on cement, lime, concrete and concrete aggregates, gypsum, and manufactured masonry units:

Committee C-1 on Cement

Committee C-1 and ten of its subcommittees accepted significant changes in the physical requirements for portland cement, as covered in the *Standard Specification for Portland Cement (C 150)* and in the *Standard Specifications for Air-Entraining Portland Cement (C 175)*, subject to letter ballot of the committee. If approved, these recommendations will be presented to the society for adoption at its annual meeting in June.

As a culmination of discussions over a period of several years, the committee will recommend the deletion of the alternate strength requirements, as now expressed in terms of tensile strength of mortar briquets. A revision of the present strength requirements, based on a recent country-wide survey of strength tests made by numerous laboratories on many cements, will be recommended; most of the revisions call for an increase in strength requirements.

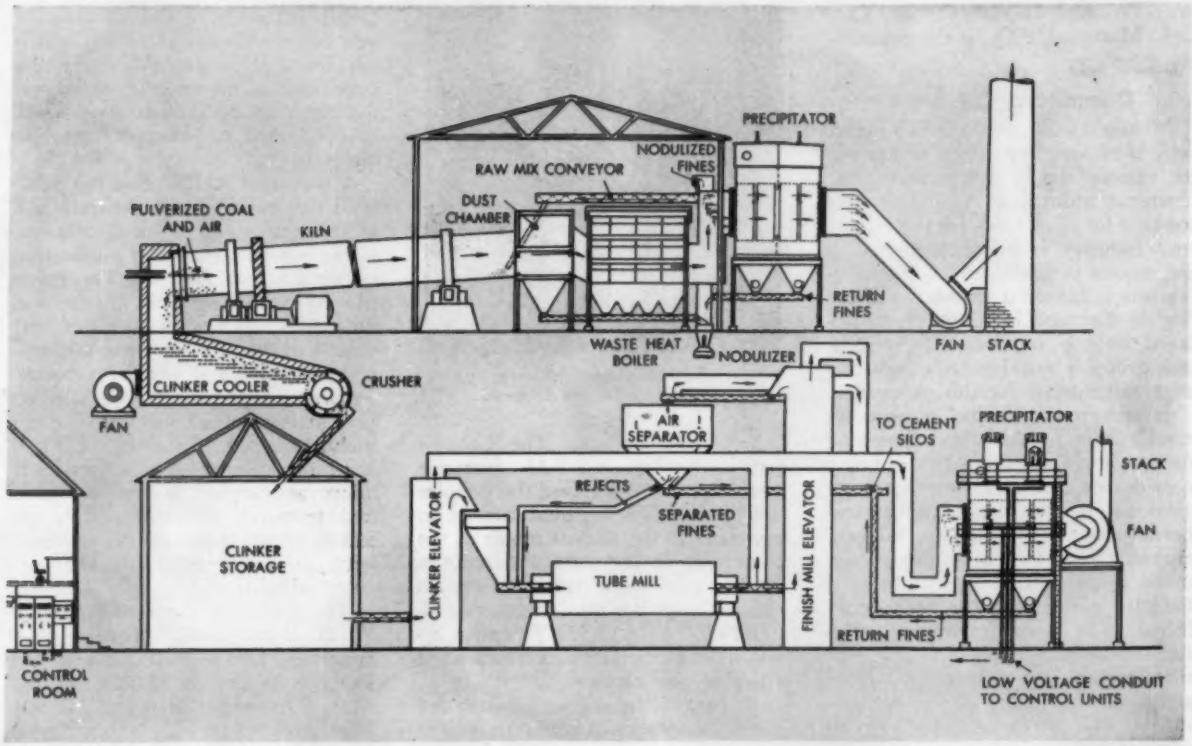
A new tentative method for the determination of false set of portland cement was accepted for letter ballot of the committee. This involves the use of the mechanical mixer and a modified Vicat apparatus using a brass rod with a stud on one end replacing the standard needle. Existing tentative methods approved for adoption as standard include the short method for heat of hydration (C 186); normal consistency (C 187); fineness by air permeability apparatus (C 204 7); and definition of the term "pozzolan" (C 219 T).

In accordance with the practice of including the presentation of a paper on subjects within its cope before the committee, an interesting talk on the history of the strength testing of cement was given by M. A. Swayze, Lone Star Cement Corporation.

The committee approved the presentation of certificates to nine present and former members of the committee.

Committee C-1 is headed by R. R. Litehiser, Ohio State Highway Testing Laboratory, Columbus, Ohio.

M. A. Swayze discussed the history of strength testing.



How dust collecting problems are handled in the modern cement plant

The "why" of the Cottrell precipitator is well known to cement plant personnel—its use in nuisance abatement and cement dust salvage is well established. These diagrams explain the "how" of the Cottrell, including its familiar application to kiln gas and, more recently, its use in the ventilating system of the finishing mill.

Kiln Gas

The upper half of the drawing shows a Cottrell for cleaning kiln gases. They are first passed through a dust chamber to the waste heat boiler and from there to the electrical precipitator, where the dust is removed. Salvaged dust is returned by conveyor to the process. The cleaned gas is discharged to the atmosphere through an induced draft fan and the stack. (Wet process kilns may also be fitted with Cottrells).

And In The Finish Mill

Dust from the grinding mills has always been a major problem. The lower half of the diagram shows the recent application of the Cottrell for cleaning finish mill ventilating system gases. Cement dust is collected from the ventilating system serving the separators, conveyors and elevators. As before, recovered dust is returned to the process.

Separating Small From Large Particles

When large particles of low alkali content must be separated from very small particles of high alkali content, an integrated mechanical-electrical precipitator will do the job effectively. The mechanical element handles large particles, and the electrical element collects the smaller particles that escape it.

Rapping Puffs Eliminated

With Research-Cottrell's electronically controlled Magnetic Impulse Rappers, there is no need for rapping shutdown periods or dampers. Automatically controlled and operated, the MI Rappers continuously rap the electrodes throughout precipitator operation, thus avoiding dust re-entrainment in the gas stream and assuring optimum precipitator performance at all times.

Many Design Advances

The MI Rapper is one example of many improvements that have taken place in the design of precipitators and their associated electrical equipment. Forty years of experience have provided Research-Cottrell with a rich store of engineering skill—it is this skill that has evolved the modern Cottrell precipitator, embodying a design based on knowledge gained through more than 2000 precipitators in many different fields. Fourteen of these have been installed or are under construction for cement plants. All of these precipitators were custom-engineered to individual specifications.

For a more complete description of the Cottrell precipitator, write to Research-Cottrell for Bulletin GB.

RESEARCH-COTTRELL, INC.

A Wholly Owned Subsidiary Of Research Corporation

MAIN OFFICE AND PLANT: BOUND BROOK, N. J.

405 Lexington Ave., New York 17, N. Y. Grant Building, Pittsburgh 19, Pa. • 228 N. La Salle St., Chicago 1, Ill. • 111 Sutter Bldg., San Francisco 4, Cal.

W. S. Weaver, Canada Cement Co., Ltd., Montreal, P.Q., is the committee secretary.

Committee C-7 Lime

Members of Committee C-3 heard reports on several projects pertaining to various lime requirements for chemical industries. A specification for lime for silica brick for the refractory industry is being prepared at the request of Committee C-8 on Refractories. Involved in this specification is the need for establishing delayed slaking requirements; and a task group is working on a performance test needed for this purpose.

It was reported that a property specification for lime and limestone for use in glass manufacture is being considered, involving four types of glass usage—optical, plate, sheet, and bottle glass. A specification for precipitated calcium carbonate is also to be considered after definite need for such a standard has been established. The need for requirements for lime used in hypochloride bleach manufacture was mentioned, but insufficient knowledge of the requirements will necessitate further investigation.

A test procedure will be prepared and distributed to Committee C-7 for determining the neutralization factor in evaluating the acidity of lime. It was indicated that a better method is needed for direct determination of unhydrated calcium or magnesium oxide in lime products with the versenate method still under consideration.

Nathan Rockwood was named chairman of a new subcommittee on pozzolanic materials. It was suggested that since a considerable amount of preliminary investigation and survey of available information will be necessary on pozzolanic materials, and symposium be held in 1956. The committee authorized a letter ballot on the combining of the two specifications for hydrated finishing lime, C 6 and C 206, under one designation.

J. A. Murray, Massachusetts Institute of Technology, Cambridge, Mass., is committee chairman, and Robert S. Boynton, National Lime Association, Washington, D. C., is secretary.

Committee C-9 on Concrete and Concrete Aggregates

Meetings were held by 23 of the 30 subcommittees of C-9 during committee week, all well-attended by both members and visitors. In the study of chemical reactions of aggregates in concrete, two methods have been recognized—the Conrow and the

R. R. Litehiser, chairman, Committee C-1 on Cement.

Scholer test methods. The Conrow test is now an A.S.T.M. tentative method (C 342 T), and the Scholer test method is being published as an appendix to the annual report of the committee in the 1954 *Proceedings*. It has now been felt necesary to change from the machine mixing to hand mixing in C 342 T; and a revision was therefore recommended covering this change.

As part of the study of elastic and plastic properties of concrete, a definition of creep has now been agreed upon by a subcommittee for use in developing a test method. The use of the soniscope in evaluating the durability of concrete was discussed in subcommittee. An attempt will be made to secure reports from large organizations in connection with the use of the soniscope on concrete structures, and to form a definition of durability. A complete revision of the sonic method for fundamental transverse frequency (HC 215 T) has been completed, which will include a longitudinal frequency determination. This revision will be circulated to the committee.

In determining the air content of concrete, action was taken to withdraw the volumetric method (C 173) and to replace it with a gravi-metric method. The pressure method for air content (C 231) will be revised to include the Washington Meter apparatus. A test procedure is being drafted using the Kelly Ball Penetration Apparatus for measuring the consistency of concrete. Consideration is also being given to the development of a method for determining the amount of cement in fresh concrete.

Revisions in the *Specifications for Concrete Aggregates (C 33)* involving more definite limits on deleterious materials were approved for committee letter ballot. A specification is being prepared for natural pozzolanic materials for use in portland cement concrete. In connection with this specification, as well as with the new one for fly ash (C 350 T), it is felt desirable to establish uniformity requirements on specific gravity of the materials. An industry survey will be conducted to obtain information on fly ash.

A proposed specification for packaged dry materials for concrete and mortar was accepted for distribution to the committee and for publication in the *A.S.T.M. Bulletin*. This specification will cover the production, properties, and packaging of dry combined materials for concrete, concrete mortar, and masonry mortar. In preparation for the necessary action at the annual meeting and for inclusion in the 1955 *Book of Standards*, the committee took action to adopt as standard several tentatives and tentative revisions, and to reaffirm those standards which have been published for more than six years without change.

The chairman of committee C-9 is W. H. Price, U. S. Bureau of Reclamation, Denver, Colo.; and the secretary is Bryant Mather, Waterways Experiment Station, Jackson, Miss.

Committee C-11 on Gypsum

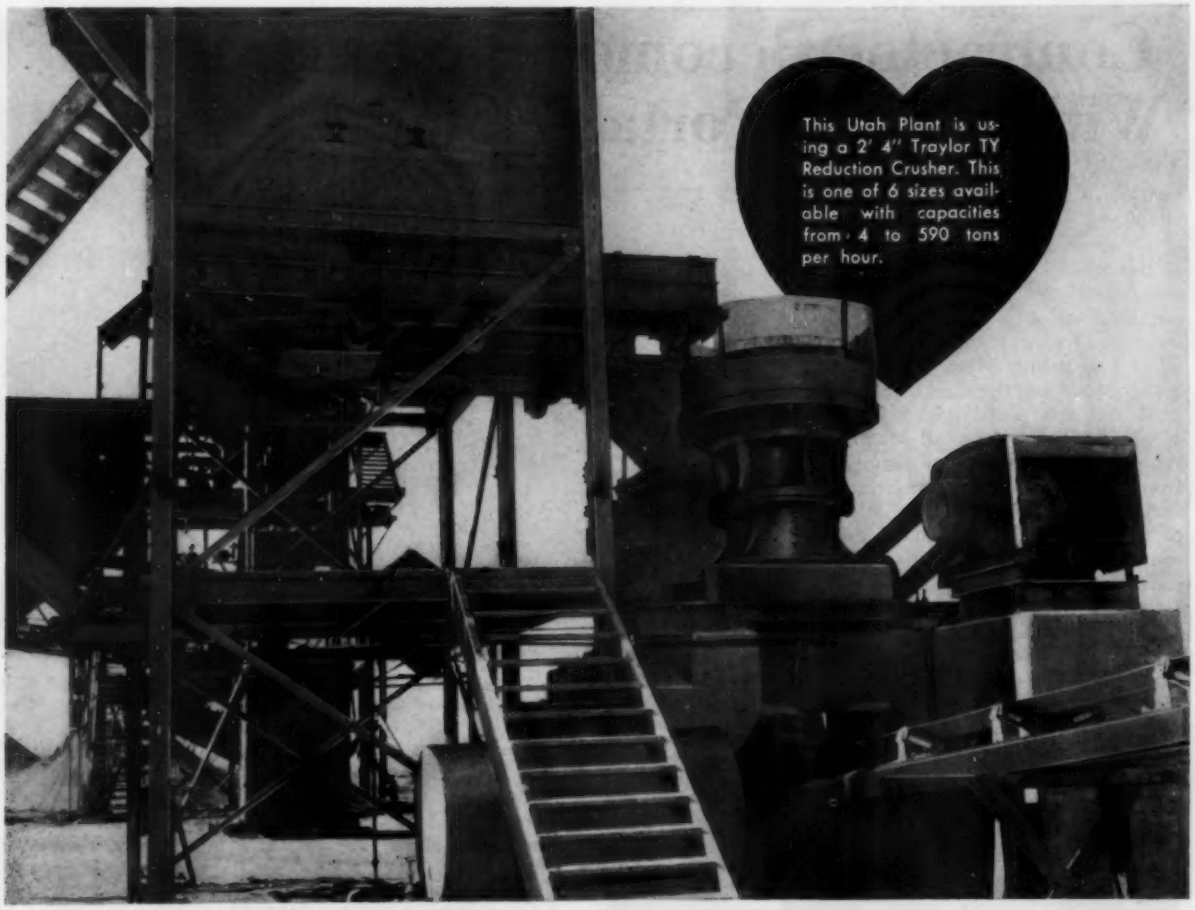
Committee C-11 focused its attention on certain accessories used in connection with gypsum products, as well as on newer types of products now being used. The subcommittee on structural products is concerned with the development of specifications for paper used in gypsum board products, in which thickness and density are the principal requirements; fire hazard was also considered.

Subcommittee consideration is also being given to a test method to evaluate mold resistance treatment of face paper on gypsum formboard. Two methods under consideration are the Tappi method T 487 and the Buchman Laboratory (Bulab) method. At the next meeting a recommendation will be made for inclusion of the preferred method in the present *A.S.T.M. Standard Methods of Testing Gypsum Products (C 26)*.

A proposed specification for reinforced precast gypsum roof-deck units was tabled for future consideration due to the drastic changes expected in both the uses and requirements of this product. The *Tentative Specification for Gypsum Concrete (C 317 T)* will be recommended to the society for adoption as standard.

Considerable attention is being given to aggregates used in gypsum. Progress was reported on a lightweight aggregate research program, in which four laboratories are con-

(Continued on page 147.)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Contractor Becomes Gravel Producer With Unique Portable-Stationary Plant

THE history of the Rosenwinkel Sand and Gravel Company of Carver, Minn., is also a history of the growth of this country in recent years. E. W. Rosenwinkel started out in 1920 as a contractor doing secondary highway work in the vicinity of Fairmount, Minn. In 1944 he began producing the sand and gravel used on this work with portable plants and took jobs all over the state. Late in 1952 he got a contract from Carver County for resurfacing and opened a pit about 1 mile west of Carver, which is about 25 miles southwest of Minneapolis. Tests showed a large deposit of quality material; so Mr. Rosenwinkel investigated the possibilities for commercial sales in this area. As a result, the company was formed, with his son Howard K. Rosenwinkel as general manager. A permanent plant was put into operation in June, 1953. This business has done so well that highway work is now a sideline.

The original plant consisted of a portable crushing and screening plant in the pit from which materials were hauled by truck to road jobs. The commercial operation uses this portable plant in the pit to do the preliminary preparation of the material for the new Telsmith stationary screening and washing plant. In 1954 conveyors and bins were added to increase the storage capacity. The capacity of this plant is now about 90 t.p.h. of material averaging 60 percent over 4-mesh in size. The entire plant is operated by a crew of three men—one on the tractor, another at the crushing plant, and a third on the washing plant, who also operates the loader. During the season there are also three truck drivers.

The tractor loader which feeds material from the pit to the portable crushing plant (left background) at the Rosenwinkel Sand and Gravel Company's operation near Carver, Minn.

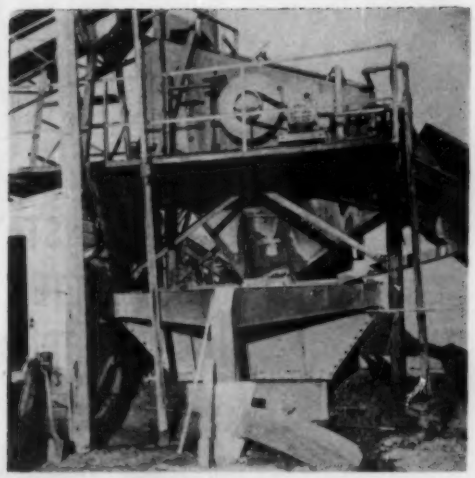
The 80-acre property is estimated to contain 3½ million tons of sand and gravel. The deposit averages 60 ft. in depth to the water table, and there is known to be at least 40 ft. of good material below water level. There is only a trace of shale in the deposit. The silt and clay overburden, averaging 10 ft. in depth, is removed by bulldozers and scrapers.

Trucks haul material from the portable crushing and screening plant in the pit (just visible in the preceding view) to the permanent washing plant.

At present a new pit is being developed, and material is fed to the plant by a Caterpillar D6 tractor-loader. This unit, which will be replaced by a larger machine in the spring, is supplemented as needed by a Bucyrus-Erie 15B dragline with a 32-ft. boom and a ½-cu. yd. Hendrix perforated bucket. The loader pushes the material to a hopper with a 10-in. rail grizzly which keeps out the few boulders. A short portable belt conveyor feeds the material to the hopper of the Universal 880J portable crushing and screening plant. A belt conveyor feeds from this hopper to a 3- by 8-ft. 2-deck screen with 2- and 1¼-in. openings. Oversize goes to a 10- by 24-in. jaw crusher set at 2-in. opening, and a Rotovator feeds back onto the conveyor to the screen. The 1¼- to 2-in. material off the bottom deck of the screen goes to a 16- by 24-in. double-roll crusher with one corrugated and one smooth roll. The minus 1¼-in. product of this crusher also goes *via* the Rotovator back to the screen. The minus 1¼-in. material through the bottom deck of the screen drops into a 3-cu. yd. hopper, from which a belt conveyor loads it into trucks for the permanent washing plant. Hauling is done by two 6-cu. yd. trucks.

At the washing plant the trucks dump into a 10-cu. yd. hopper. A belt feeder serves a 20-in. by 51-ft. belt conveyor, which in turn discharges into a wash box where a 2-in. solid spray under high pressure soaks

An unusual shot of the permanent plant, showing the three conveyors to the truck-loading bins and at the right (in the background) the sand conveyor.



This closeup shows the 4- by 10-ft. 3-deck screen and the 20-in. by 15-ft. twin screw sand classifier below.

Here a 1-cu. yd. 4-wheel-drive front-end loader is loading a truck from stockpile.

Posing before a company truck are Howard K. Rosenwinkel, general manager; E. W. Rosenwinkel, owner; Fred Scheff, Cannon Falls Sand and Gravel Company, Cannon Falls, Minn.; and George Linton, auditor.

and breaks up any shale ahead of the screen. This is a 4- by 10-ft. Telsmith Vibro-King 3-deck screen, usually carrying ¾-in., ⅜-in. and No. 4 wire cloth.

The material off the top deck—¾- to 1¼-in.—is discharged by a 20-in. by 39-ft. radial conveyor into a 40-ton steel truck-loading bin. This material is sold chiefly as concrete aggregate and is stockpiled by trucks for winter shipment.

The ⅜- to ¾-in. material off the second deck of the screen is also a concrete aggregate (state specification CA5). It is discharged from a 20-in. by 51-ft. conveyor into another 40-ton bin and is also stockpiled by trucks.

The No. 4 to ⅜-in. material off the bottom deck of the screen, known as buckshot, is sold for concrete block manufacture, seal coat, etc. A 20-in. by 40-ft. belt conveyor feeds this material to a third 40-ton bin for truck loading and stockpiling.

The minus No. 4 fines through the bottom deck of the screen make concrete sand. It drops into the 20-in. dia. by 15-ft. Telsmith twin screw classifier. A 20-in. by 60-ft. belt conveyor feeds the dewatered sand to a hopper, which in turn feeds it onto an 18-in. sectional stockpiling conveyor system. This is now 170 ft. long and rests on the stockpile, but is to be mounted on a steel framework. It now discharges at about 50 ft. above ground level; bulldozers have spread it into a 65,000-ton stockpile.

Delivery trucks are loaded from stockpiles by a Caterpillar D4 tractor equipped with a 1¼-cu. yd. HT4 loader and a new Michigan 75A 4-wheel drive front-end loader with a 1-cu. yd. bucket. The company operates two Chevrolet 2-ton trucks for delivery purposes, each equipped with 6-cu. yd. boxes. All shipments are weighed on a 25-ton Thurman truck scale at the plant office. About two-thirds of the output is contracted to concrete block and ready-mixed concrete producers and is delivered via the company's fleet of trucks.

Water for washing is supplied from a pond by a Fairbanks-Morse 900-g.p.m. centrifugal pump. The portable plant is powered by a Caterpillar D8800 engine. The washing plant is all electrically driven. Each of the five short belt conveyors is driven through enclosed gears by a 5-hp. motor. The screen is V-belt driven by a 7½-hp. motor and the classifier by a 10-hp. motor. Thermoid conveyor belts are used throughout the plant. A No. 11 Caterpillar motor patrol is used for maintaining haul roads, for snow removal, etc.

The plant has been operated two shifts daily during the fall to build up stockpiles to carry through the winter. The plant is shut down about four months during the winter, but the plant crew of three men is kept on doing repairs, odd jobs, loading out, deliveries, etc.

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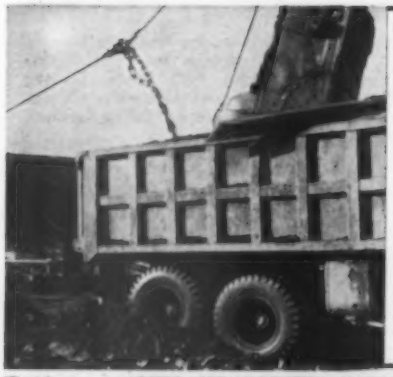

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says P. Carreale, Carreale Construction, Hazleton, Pa.

"There's no tougher test for tires than anthracite coal stripping. A tire failure here can knock out a truck for a full 7-hour shift—*for a $400 loss.* With their terrific carcass strength, U. S. Royal Con-Trak-Tors have *practically eliminated* our downtime."

"A 32% increase in mileage"

says Ben Gerttula, A. A. Kerry Logging, Taft, Ore.

"Our trucks haul timber out of the forest, over steep mountain roads to the mill. We tried 8 different makes of tires on the job. Now we use U. S. Royal Fleetmasters, because they average a *32% increase in mileage* and 2 more recaps!"

From leading truckers of every type and size, all across the land, comes *evidence* of the outstanding performance of the new U. S. Royal Truck Tires—the result of a determined 4-year project recently completed by U. S. Royal engineers.

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ROYAL TRUCK TIRES

Labor Developments

(From page 126.)

compensation idea; but because the framers of the proposal believe that employers can, with effort, do much to stabilize employment, they lay much more stress on providing incentives for such stabilization. Thus, under their proposal, unless a worker is notified in advance that he is to be laid off for an entire week, the employer is required to give him 40 straight-time hours of work or pay him for them. Also, every worker who has passed his probationary period who is laid off will be paid the difference between his unemployment compensation benefits and "an amount sufficient to enable him to maintain the same living standard as when employed" up to the maximum of ½ the number of weeks in which he received compensation after the end of his probationary period, but in no event for more than 52 consecutive weeks. This is to be paid, in the first instance, by the employer up to the point where the payments reach a specified percentage of his payroll.

Further payments are made from a reserve fund to which the employer has previously contributed. The financial incentive provided for the employer to stabilize his employment is that he can reduce his cost—even to zero: If employment of covered workers is stabilized, no guarantee payments need be made; and once the reserve fund is built up to the required size, no further contributions to it are required.

Other unions, too, have developed proposals which incorporate some or all of these various concepts and frequently a few new ideas of their own. To be sure, some of them are continuing to ask for (and occasionally winning) what appear to be quite close to 100 percent guarantees.

It is clear, however, that the demand is far from rigid. The long standing plans have few comparable features. There are even fewer areas of comparability when placed alongside the newer proposals. But all of these diverse arrangements have one thing in common. They are all attempts to secure a measure of income security. Perhaps it would be better to call them "income security plans".

The "Guaranteed Annual Wage" appears to have become a slogan. The unions are really asking for programs for greater income security. It is this change in approach which is destined to give employers the most trouble. It was relatively easy to oppose guaranteed annual wages and win the fight. Even New Deal and Fair Deal government boards twice refused to grant guaranteed wages.

However, income security plans designed around the special characteristics and idiosyncrasies of the industry in question present an entirely different matter. The outcome of the "hassle" in the automobile industry may well determine the direction of wage movements in the United States for many years.

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Arizona Nonmetals Described By Research Consultants

Arizona Research Consultants, Inc., recently published a report describing many of the nonmetallic natural resources found in Arizona. This 85-page report discusses extensive deposits of such materials as bentonite, fluorspar, silica, scoria, pumice, lithium, mica, rare earths, diatomaceous earth, gypsum, barite, feldspar, and many other materials.

The study was conducted under a contract with the Arizona Development Board, a newly-organized state function designed to encourage the industrial development of Arizona. Distribution is sponsored by the Arizona Development Board, Capitol Annex, Phoenix, Ariz.

A.S.T.M. Committees

(From page 140.)

ducting a test series involving tensile strength, compressive strength, and volume changes of plasters made with vermiculite aggregate. Studies on variations in densities and proportions are being made using a considerable number of sources of vermiculite. Results of tests completed on the effect of grading on perlite aggregate will be distributed for subcommittee review. Also being distributed is a survey of sand gradings being used throughout the country.

Important additions to the membership of the committee were approved which will provide a much broader representation of the various interests in the field of gypsum and gypsum products. The new members are primarily in the consumer and general interest classifications, including representation from such interests as contractors, the Federal Housing Administration, the National Association of Home Builders, and the Armour Research Foundation.

G. W. Josephson, U. S. Bureau of Mines, Washington 25, D. C., is the chairman, and the secretary is O. H. Storey Jr., Gypsum Association, Chicago 6, Ill.

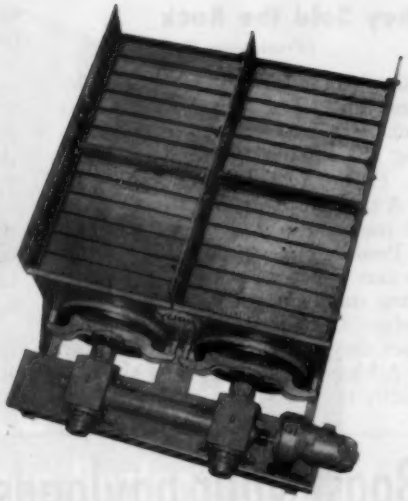
Committee C-15 on Manufactured Masonry Units

This committee considered several new fields of standardization and reviewed the status of existing standards. The new subcommittee on waterproofing materials for unit masonry walls discussed at some length the scope of its activity. In order to crystallize the thinking of the group, assignments were made to prepare for (1) the consideration of suggested methods of testing; (2) effect of water or moisture from other than exterior sources; (3) and definition by title of the function of the subcommittee.

In a review of existing standards, the committee took action to submit to letter ballot a revision of the specification for concrete brick (C 55) in respect to reference to the proper absorption test method, C 140.

The officers of this committee are J. W. Whittemore, Virginia Polytechnic Institute, Blacksburg, Va., chairman; and M. H. Allen, Structural Clay Products Research Foundation, Chicago, Ill.

KENNETH A. BARKER SR., 70, chairman of the board of directors of Louisville Asphalt Company, Louisville, Ky., died of injuries received in a recent fall.



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Stainless steel hutch valves and screens prevent rusting and clogging. Rubber seal between screen grids and basket confines action to screen area. Long-wearing hutch diaphragms of reinforced synthetic rubber can be replaced easily.

"Package Drive" units for YUBA jigs are interchangeable, completely enclosed, self-lubricating. Generous use of antifriction bearings reduces power required. Maximum frequency of a 4-cell M-8 jig is 350 at ¼". Stroke adjustments between ¼" minimum and 3" maximum are easily and quickly made, enabling you to closely control jig action.

YUBA jigs can be installed in new or old dredges and plants. Design saves space, reduces down-time, increases production. Send us data on sand and aggregate sizes produced, materials to be removed and present setup, if you wish us to furnish details for adapting YUBA jigs to your operation.

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They Sold the Rock

(From page 39.)

unloaded from both sides at the same time. The longest haul by lift truck, from freight car to minus 10 deg. F. storage space, is now 150 ft. Trucking facilities are adequate.

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It is now estimated that doubling the present size of the floor space, will require an additional expenditure of $4,000,000, to add another 5,000,000 cu. ft. of storage area of all types. Other company executives in addition to Mr. Strauss are Joseph E. Press, vice-president and A. E. Margolin, secretary-treasurer.

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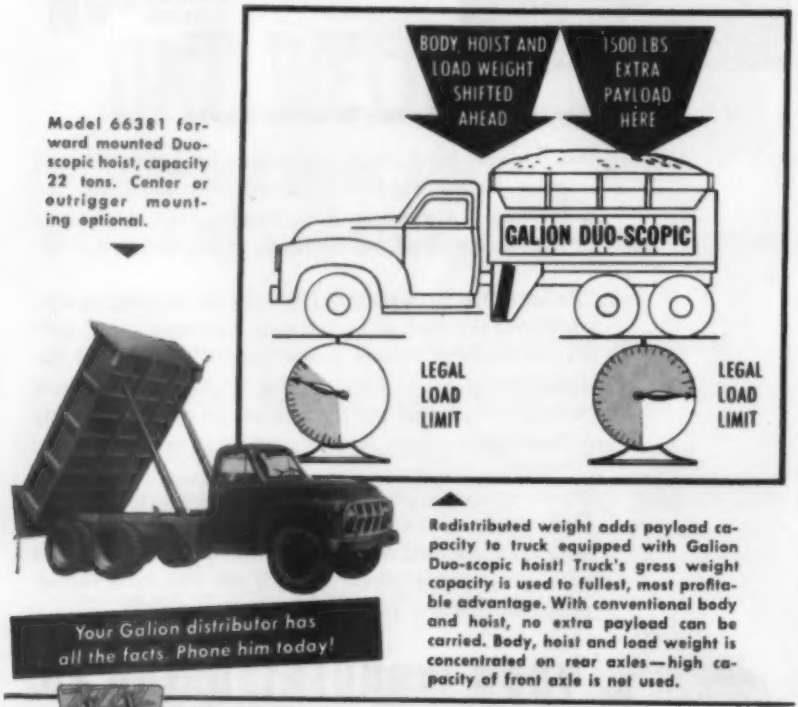
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A.I.M.E. Convention

(From page 134.)

Industrial Sand

One of the highlights of the meeting was the session held on special sands and abrasives; this marked the first time an entire session was devoted to industrial sands.

In his paper *Industrial Sands and Abrasives in the Southern Mid-Continent Region,* William E. Ham, Oklahoma State Geologist, described seven highly siliceous materials produced extensively for industrial sands and abrasives in Arkansas, Kansas, Missouri, Oklahoma, and Texas. The high-purity silica sands of Ordovician age in Missouri, Oklahoma and Arkansas, along with similar sands of Cretaceous and Tertiary age in Texas, furnish the most important commodities. Principal uses are in glass and sodium silicate manufacture, foundry sands, hydraulic fracturing of oil-bearing formations, grinding and polishing plate glass, and sand-lime brick.

From the Arkansas novaculite of Devonian age in central Arkansas are produced whetstones of exceptionally fine quality, tumbling blocks, and stone for silica brick; and porous novaculite is ground for use as fine abrasives and in making fiberglass.

Volcanic ash or pumicite from Pliocene and Pleistocene deposits in Kansas, Oklahoma, and Texas is produced as the abrasive agent in cleaners and soaps, and as a ceramic glaze. Tripoli from Oklahoma and Missouri is used in fine polishing and buffing compounds, and fillers and foundry facings, and for concrete admixture. Chat from the Tri-State district of Missouri, Kansas, and Oklahoma finds abrasive use in sand blasting and sawing sand; and flint grinding pebbles are produced in Texas.

Special river sands in Kansas and Arkansas are processed to make quartz-feldspar mixtures for fiberglass, coarse sand for hydraulic fracturing, and naturally bonded foundry sands.

Flotation of Del Monte Sands, prepared by William E. Messner (now deceased), was read by Hugh Bein, Del Monties Properties. For 35 years this firm has produced sand products for a large variety of West Coast Industries. The most recent use has been the manufacture of glass containers—both amber and flint.

The raw material occurs in large windswept dunes formed by onshore winds transporting beach sands to their present position. The sands, derived from the granite which forms

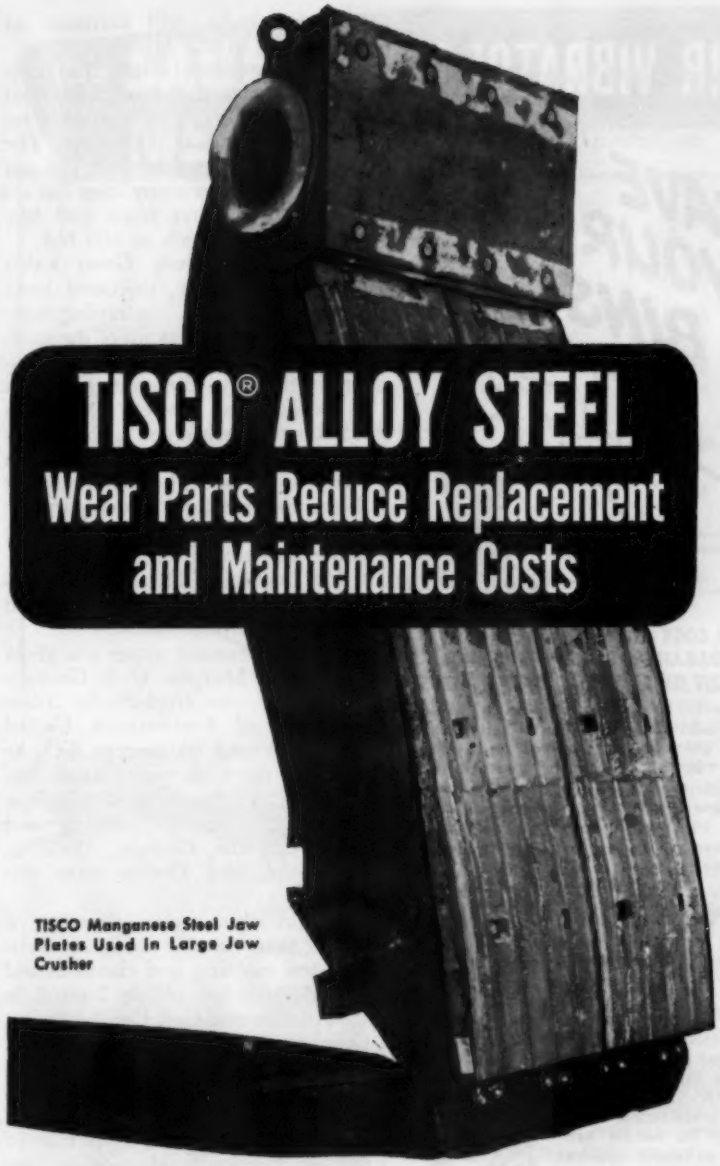
the coast line, consist primarily of nearly equal amounts of quartz and feldspar, with smaller amounts of biotite, ilmenite, garnet, zircon and monazite. The Fe_2O_3 content ranges from 0.12 to 0.18 percent and the Al_2O_3 content averages 11.5 percent.

Since sand for flint glass must contain less than 0.05 percent Fe_2O_3, considerable research was spent in determining how the iron content in the raw sand could be lowered to this amount. This test work showed that intensive scrubbing and complete desliming was absolutely necessary. Clay and iron oxide coating are removed in this manner. American Cyanamid Reagents 801 and 825 are used in an acid flotation circuit to remove the "heavies" from the scrubbed and deslimed pulp. The resulting tailings are acceptable in their iron content.

A relatively new and important use for industrial sand was described by W. E. Hassebroek, Halliburton Oil Well Cementing Co., in his paper *Sand Usage in Hydraulic Fracturing Oil Bearing Formations.* This process increases production from a formation by generating new and greater effective permeability. This is accomplished by hydraulic pressure transmitted with a viscous fluid pumped into a zone under treatment. Resistance to flow within the formation permits development of pressures which can create a splitting of the formation. The viscous fluid carries suspended quantities of graded sand grains which are added during the injection period. When the pressure is released after treatment, treating fluids return as production, leaving the selected sand within the created fracture to serve as a propping agent to hold the fracture open.

The sand propping agent is an important constituent. Rounded silica sand grains averaging approximately .026 in. in diameter normally are used, although some smaller and some larger particles have been employed. Close tolerance in grading is desirable and cleanliness is essential. Angular and sub-angular grains have performed satisfactorily in selected formations but have not proved acceptable over a wide range of conditions. Sand is transported either in bags or in bulk. Machinery of special design mixes it with the fracturing fluids at the well where ratios of the two ingredients can be varied as desired.

Within a span of six years the oil industry has seen hydraulic fracturing grow into a standard production improvement technique. Silica sands have played a vital role in its growth



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Wear Parts Reduce Replacement and Maintenance Costs

TISCO Manganese Steel Jaw Plates Used in Large Jaw Crusher

For more than seventy years Taylor-Wharton has specialized in alloys that resist impact and abrasion. As the pioneer producer of high manganese steels in the United States, the Company has always been closely identified with this material. More recently Taylor-Wharton has supplemented its line with other alloys of outstanding characteristics, to better cover a wider range of application requirements.

Among these are TISCO 150-Y, a high chrome cast iron, capable of heat treatment up to 700 Brinell. It has strong resistance to severe abrasion, where impact is not a factor. Some outstanding applications are extrusion augers, scraper blades, agitator blades and mixer paddles.

Another useful alloy is TISCO 23-Y, a heat hardenable medium manganese chrome molybdenum steel of excellent abrasion resistance but only fair impact qualities. Hardness can be controlled between 300-500 Brinell. It is widely used for ball and rod mill liners, bushings and similar applications.

Remember—if your problem is impact or abrasion, or both, talk to Taylor-Wharton.

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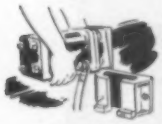
SAVE YOUR BINS

Type "F"

LOW COST AIR VIBRATORS GUARANTEE STEADY MATERIAL FLOW OR SETTLE CONCRETE MIXES

Powerful hammer-like blows delivered by CLEVELAND Type "F" air vibrators prevent arching-over and plugging in bins, hoppers and chutes. These dependable units have been designed for use on all types of hoppers and bins handling sand, cement, cinders and all other granular materials.



Type "LSRR"

LSRR air vibrators utilize cast steel male wedge type mounting bracket which fits the female bracket that is standard equipment on most covered hopper railroad cars. In addition, female brackets can be furnished for attachment to bins, concrete forms, chutes, etc., and a single LSRR vibrator can be moved from one installation to another to handle several different applications.

Type "VG"

New vibrators featuring a portability and rapid, easy attachment to wooden studs or metal structural members are now available. These units are recommended for use on concrete forms, hoppers, bins, dump trucks, etc. to settle or shake-out their contents.

Type "UH"

These CLEVELAND air vibrators and many others are illustrated and described in the new CLEVELAND VIBRATOR catalog. Write today for your copy.

THE CLEVELAND VIBRATOR CO.

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and, no doubt, will continue in importance in the future.

Mr. Hassebroek stated that average use per well treatment is about 4½ tons, although certain wells require as much as 125 tons. The system is being used on both old and new wells, and in many cases has increased production from 150 bbl. per day to as much as 500 bbl.

Warren D. Lewis, Great Lakes Foundry Sand Co., discussed bank sands in Michigan, contrasting these to the famous dune sands of the state. He described several production centers in the state, the most important of which are western Michigan (Ludington, Muskegon), southwestern Michigan, and eastern Michigan (Saginaw area). The major use for these sands are for foundry purposes (molding, core, shell mold, etc.); minor uses are fillers, grinding, etc.

Mr. Lewis also discussed the characteristics of the various deposits, and methods of production.

Another resource paper was given by Tom D. Murphy, U. S. Geological Survey, on *High-Purity Silica Resources of Southeastern United States;* he used 95 percent SiO_2 to delineate the high purity sand. Deposits in Virginia, West Virginia, Kentucky, Tennessee, North and South Carolina, Georgia, Alabama, Mississippi, and Florida were discussed.

Within this region deposits of quartz sand suitable for glass melting, steel molding, and chemical and ceramic uses are chiefly limited to the Atlantic and Gulf Coastal Plains. Quartzose gravel for metallurgical, refractory and special uses is restricted to relatively small areas in the Carolinas, Alabama, and Florida. Chert gravel for use as a flux in electric furnace production of elemental phosphorus is produced in Alabama.

Quartzose sandstone of commercial purity occurs in several areas in Virginia, West Virginia, Kentucky, and Alabama. Quartzite of refractory and metallurgical grade is found chiefly in Virginia, North Carolina, Georgia, and Alabama. A special variety called baukite, suitable for use as firestone, is found locally in Tennessee and Mississippi.

Massive quartz suitable for glass melting and ceramic use occurs in pegmatites in North Carolina, and deposits of vein quartz, suitable for these uses are found in Virginia, North Carolina, and Georgia.

Dr. Murphy concluded by stating that silica raw material resources are adequate to meet any foreseeable demand. Utilization has been retarded chiefly because of a deficiency of cheap fuel and remoteness from main consuming centers. The silica industry of southeastern United States is expected to expand, however, with the accelerating industrial growth this region is experiencing.

Robert J. Maddison, Whitehead Bros. Co., presented a paper on *Eastern Bonded Sands.* Introduction of eastern bonded sands to the foundry industry more than 100 years ago allowed America to become independent of European sand.

Bonded sands from southern New Jersey and Albany, New York producing districts have been and still are an important basic raw material for the economic formation of metal parts. The development and growth of the bonded sand business has been closely allied to the expansion of American industry.

An intimate knowledge of the deposits with respect to their occurrence and the properties of the sands is necessary. Field laboratories have been established to measure the qualities of the sand and for the purpose of maintaining uniformity of shipments. Development within the foundry industry during the past 25 years has taken place at a relatively rapid rate. As a result many tests requiring specialized equipment and techniques have been devised for the testing of sand.

Application of the Phi Scale to the Description of Granular Materials was given by Charles H. Bowen, Ohio Geological Survey. The speaker reported that the Phi scale was originally devised in order to facilitate the description and statistical analysis of clastic sediments. Certain graphically obtained statistical parameters—the median grain size, the decile (or quartile) deviation, etc.—derived from a cumulative frequency plot may be quite useful to industry. These size attributes are simply and easily obtained. Further, the spread of the distribution may be expressed directly in terms of sieves, thereby allowing direct comparisons between samples to be made.

The Phi scale, through its relationship to the Wentworth grade scale, can be applied directly to the U. S. Standard sieve series. Hence, any small-interval sieve series based upon these standard screens may be used in the size analysis procedure.

The Phi scale thus has potentialities for use in describing industrial sand and aggregates, particularly where median grain size, spread of the size distribution and asymmetry of the distribution may have an important bearing on the product.

Personal Mention

J. M. WOLFE, formerly with Allis-Chalmers, and more recently assistant chief engineer for the Traylor Engineering and Manufacturing Company, has assumed the position of chief engineer for the Missouri Portland Cement Company.

AL CARTER, for many years plant superintendent for the Arizona Sand & Rock Company, Phoenix, Ariz., resigned from this post on March 1 to go into business for himself in Flagstaff, Ariz. The new concern, Flagstaff Concrete & Materials Company, will be owned and operated by Mr. Carter and his associates, J. R. PORTER and JAMES RAY, veterans in the Arizona contracting field. Besides producing aggregates, the firm will turn out ready-mix, asphaltic mixtures, and will also engage in a general trucking business.

Effective April 1, OLIVER W. JOKERST will be district sales manager, with headquarters in St. Louis, Mo., for the National Gypsum Company, succeeding ROBERT A. PENCE, retired. At the same time, ROBERT L. MACKLIN becomes assistant district sales manager in the St. Louis area.

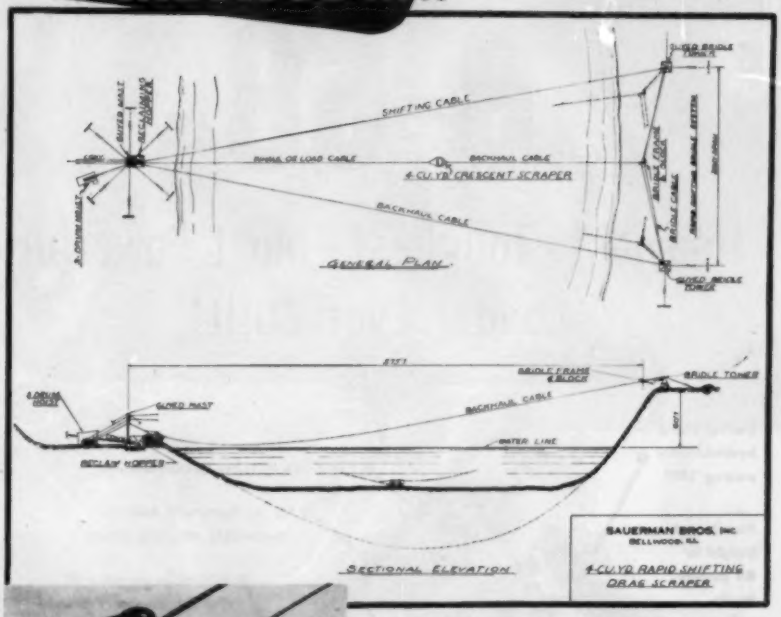
Formerly assistant district sales manager in St. Louis, Mr. Jokerst started with National Gypsum in 1947 as a general line salesman. Previously he had been associated with the St. Louis Star-Times and General Motors.

Before joining National Gypsum in 1948, Mr. Macklin was employed by the Cadillac Motor Company and the Capitol Insulation Company, Danville, Ill.

PHILIP D. JONES, traffic manager of Material Service Corporation, Chicago, Ill., was appointed traffic manager for a company subsidiary, the Marblehead Lime Company, in addition to his former duties.

ALLAN M. DOUGLASS has been appointed to the newly created post of general sales manager of Material Service Corporation, according to an announcement released by Colonel Henry Crown, chairman of the board. Mr. Douglass previously had headed his own firm, Douglass Architectural Products Company, Chicago, Ill.

the SAUERMAN METHOD.... Scraper Machines Engineered to Your Operation



Above drawing was prepared for a specific drag scraper installation and does not represent maximum spans.

View shows rapid shifting bridle frame and all operating cables. Crescent may be seen in background conveying load to reclaiming hopper just in front of mast.

•

Contact Sauerman's engineering department for specific recommendations and information. No obligation.

Ask for Catalog A, Drag Scrapers—24 pages of job photos and specifications. Request Field Reports showing your material being handled by the low cost Sauerman Method.

The Sauerman Method works equally well over widely differing areas and span limits . . . on hills, swampy ground or underwater . . . handles any material a dragline can dig.

Every scraper machine is powered by a Sauerman Roller Bearing Hoist, especially designed to withstand sudden shocks and changes in speed.

When a rapid shifter is used, a third hoist drum is added to shift the bridle frame. The rapid-shifting bridle system (upper right of drawing) permits frequent shifting of the scraper's line of operation in non-caving material, shallow excavations or overburden.

Operating costs are lower—basically, it is cheaper to drag material than it is to lift and transport it. You eliminate the power costs of moving heavy machinery about the area. You pay only for pay loads—not dead weight. When expendable parts—sheaves, clutch or brake linings—are replaced, the machine is restored to practically new condition.

Sauerman can help you select the method of materials handling most profitable for your job—a system that will give you the lowest cost per cu. yd. handled.

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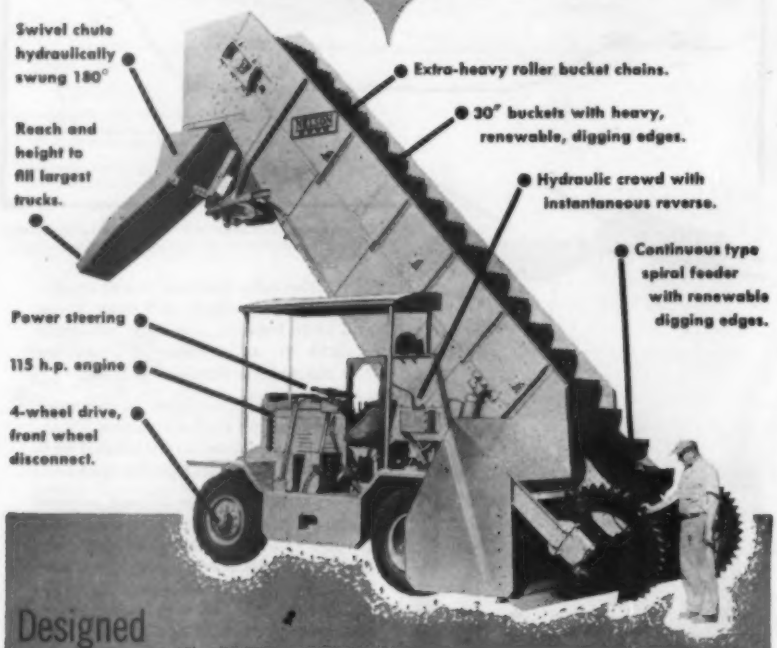
Heaviest • Toughest • Most Powerful Loader Ever Built!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Will pour *10 tons per minute* into the largest trucks without 'jockeying' under chute, distributes it evenly from front to rear. One man controls entire operation . . . Moves under own power at 20 m.p.h. speed!

MATERIAL FLOWS CONTINUOUSLY from stockpile to truck—the fast, easy, economical way!

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No. 1643

THOMAS D. SHIELS has been appointed district engineer of the Austin, Tex., office of the Portland Cement Association, according to an announcement released by G. Donald Kennedy, association president. He succeeds James D. Piper, recently promoted to the position of vice-president for promotion.

Three appointments have been announced for the industrial relations department of Universal Atlas Cement Company.

Effective immediately PHILIP N. BUSHNELL is appointed director of labor relations; JAMES F. COLLINS becomes director of personnel and training; and WILLIAM A. KIPP is made director of safety.

Mr. Bushnell has been with Universal Atlas as assistant manager, industrial relations, since 1943. He is a member of the Industrial Relations Research Association and past chairman and member of the executive committee of the Cement and Quarry Section of the National Safety Council.

Mr. Collins joined Universal Atlas in 1946 as supervisor of personnel and training. He is a member of the New York Personnel Management Association and the American Society of Training Directors.

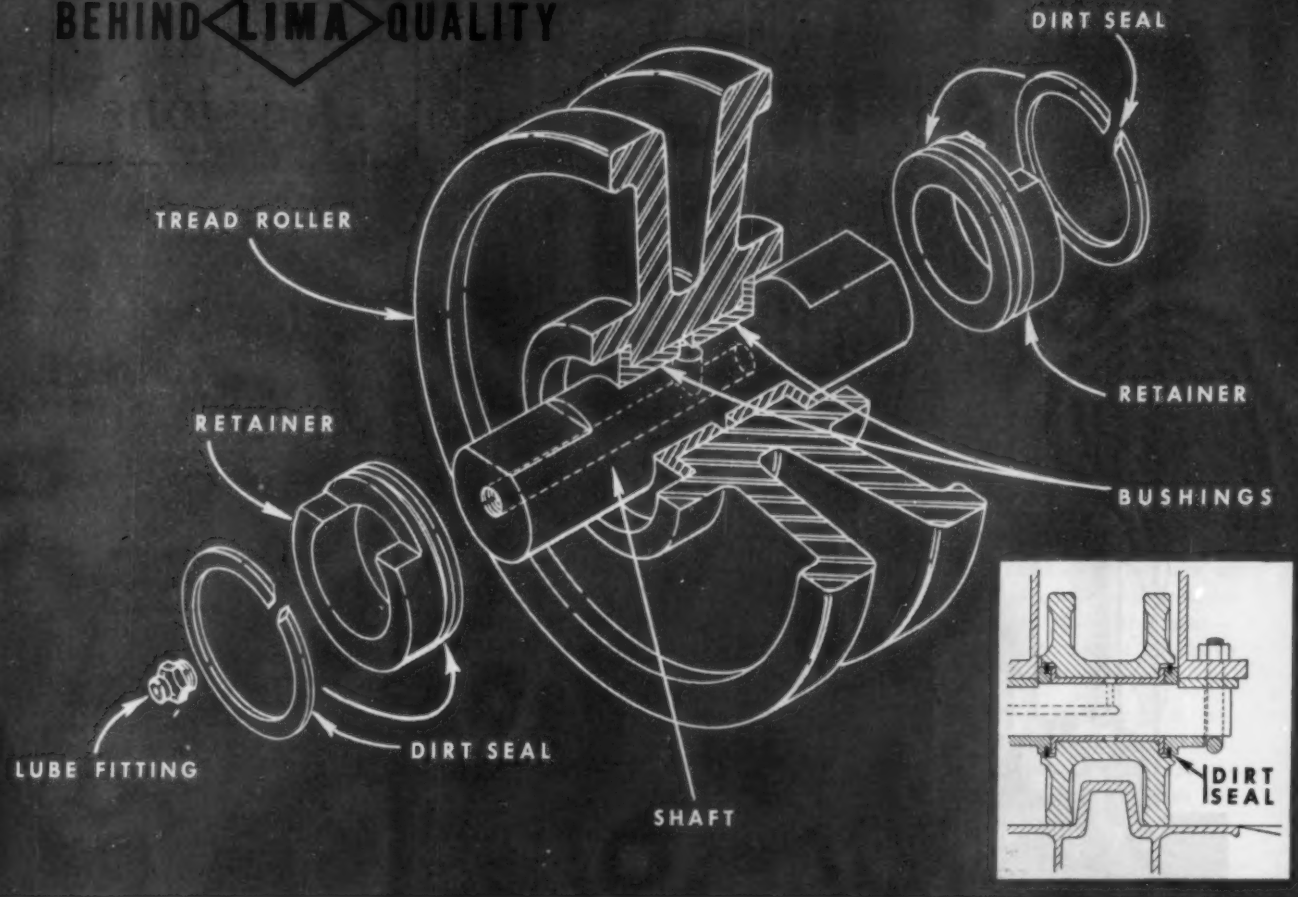
Mr. Kipp joined Universal Atlas at its Leeds, Ala., plant in 1924. After serving several years in the Army he rejoined the company as staff assistant in the industrial relations department. He was appointed supervisor of safety in 1948.

CHARLES H. BOYD JR., Newberry, S. C., has been appointed assistant sales manager of the Birmingham, Ala., office of the Universal Atlas Cement Company. Mr. Boyd had been covering South Carolina in a sales capacity for Universal Atlas since 1945.

Spokesmen of Mexico Refractories, Mexico, Mo., have announced the appointment of CAREY LINDSAY as plant manager of the Niles Fire Brick Company, Niles, Ohio, which was recently acquired by the former concern.

Naming of B. L. BUSSE as assistant superintendent of the Milwaukee, Wis., packing plant of the Universal Atlas Cement Company has been announced. Mr. Busse joined the firm in 1930 and for the last 16 years has superintended Universal's warehouse at Green Bay, Wis.

BEHIND LIMA QUALITY



LIMA dirt seals cut down-time and maintenance costs

Effective piston-ring-type dirt seals in the tread rollers are another quality "extra" you get when you use a LIMA. Abrasive material which wears out the bushings and shafts of ordinary machines is excluded. LIMA seals the lubricant in and dirt out to reduce friction and prolong the life of bushing, roller and shaft.

COMPARE QUALITY! No other machine gives you as much as LIMA!

1. Piston-ring-type dirt seal rings and retainers.
2. Moving parts are flame or induction hardened for longer life.
3. Main machinery is placed well back of the center of rotation.
4. Anti-friction bearings at all important bearing points.
5. Big capacity drums and sheaves.
6. Propel and swing gears and power take-off are enclosed in a sealed oil bath.
7. Torque converter (optional).
8. Wherever you are, you can depend on skilled service and nearby warehouse stocks of parts.

The features listed above contribute to LIMA'S greater output with less down time and lower maintenance costs. Users agree! It costs less to own a LIMA!

This LIMA demonstrates the importance of LIMA'S dirt seals and grease retainers.

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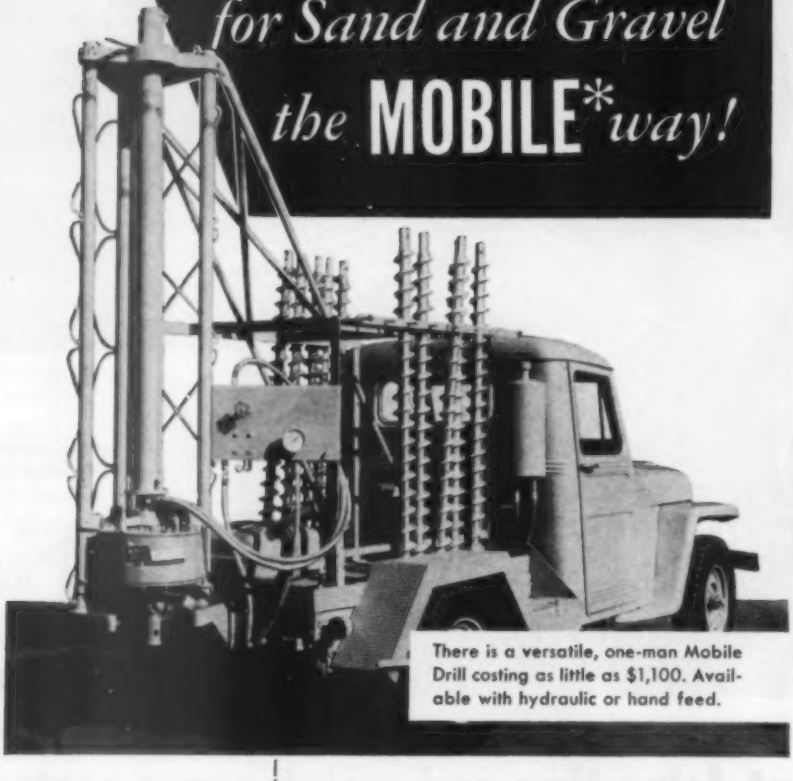
for Sand and Gravel
the MOBILE* *way!*



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Legal Decisions

By LEO T. PARKER
Attorney at Law
Cincinnati, Ohio

In this article I shall briefly review interesting and leading higher court decisions on two legal subjects, about which several readers of PIT AND QUARRY have asked. These include liability of contractors for damage to private property and personal injuries resulting from blasting and excavations, and contract liability.

General Blasting Law

First, it is important to know that some higher courts have held that even in the absence of negligence, a contractor engaged in blasting is liable for damages caused to private property. For variations of the law in detail, see 22 *Am. Jur.* 180, and 35 *C. J. S. Explosives,* 8 p. 238; annotation 92 A.L.R. 741; and *Holden* v. *Carmean,* 178 Ark. 375.

On the other hand, all higher courts hold that contractors are liable in full damages for injuries to both person and private property caused by negligent blasting operations. The courts explain that the legal term "negligence" means that the contractor did not use the same degree of care that would have been exercised under the identical circumstances by other contractors who are reasonably prudent and experienced in blasting operations. Under certain circumstances the jury will imply negligence on the part of the contractor, and will award the property owner all sustained damages.

For instance, the leading case of *Benton* v. *Wright,* 175 S. W. (2d) 208, the owner of a dwelling sued a contractor for damages to his home. He proved that the use of dynamite by the contractor caused the well on his property to go dry, and that his house was moved on its foundations.

The jury promptly rendered a verdict in favor of owner of the property. The higher court approved the verdict and said:

"Where the injury to real property is temporary, the measure of damages, in a case like this one, is the cost of restoration to the condition prior to the injury, plus decreased rental value from the time of injury to the time of award for restoration."

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YOU get *three* big advantages over other hoists when you specify the *new* Gar Wood "Strong-Arm". (1) You get more lifting capacity per dollar. (2) You get longer hoist life because of better engineered construction. (3) You get easier maintenance without need for special tools or hydraulic specialists.

More payload capacity

Tapered cylinder heads on the new Strong-Arm hoists assure lower mounting, which develops a more powerful lifting leverage. In addition, 55° dump angle, plus advanced lifting point enable the new Strong-Arm to handle bigger payloads with far less strain on body, hoist and pump.

Longer life

New Strong-Arm design features a rugged torque tube which keeps both arms in positive alignment at all times . . . ends the old headache of binding and buckling under uneven loads. Simple toggle action of the torque tube eliminates extra moving parts.

Easier to maintain

Strong-Arm hoist cylinders are of 3-piece construction — with new reservoir-type head, tube and base — all held together by an exclusive bolted tie-rod assembly.

This simplifies maintenance, reduces parts replacement costs. Weldless cylinder is precision-honed and has 4-ring piston for positive holding, plus triple protection against over-travel damage.

Famous Gar Wood laminated pump is small, compact, roller-bearing-mounted for long, quiet operation. Precision construction eliminates gaskets and hand fitting . . . simplifies field repair by average mechanic and standard tools. Direct pump-to-cylinder hose connection permits straighter, shorter drive on any chassis . . . eliminates wear on drive and universal joints.

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Strong-Arm hoists are now available in standard, medium and heavy-duty models from 8 to 27½ ton capacity, with a choice of matching standard, medium and heavy-duty dump bodies. See your Gar Wood distributor or factory branch for complete facts today.

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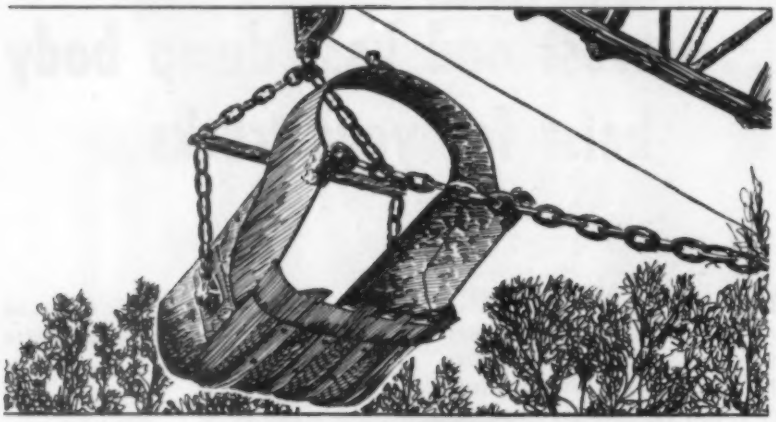

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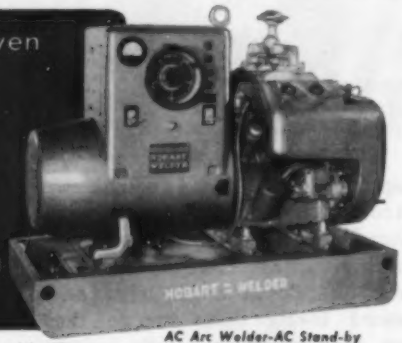

Speed up your work and cut welding costs with this revolutionary new type of Hobart combination unit. Hobart's ingenious generator design lets a single generator and air-cooled gas engine provide power—either for welding or 110/220-volt power, all at the press of a button. Surprisingly compact and lightweight for easy moving. Can be mounted on truck or trailer—ready on a moment's notice.

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AC Arc Welder-AC Stand-by Power Unit. Power for tools, lights and arc welding anywhere.

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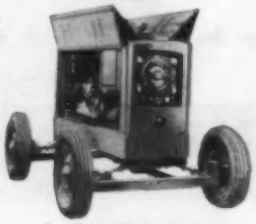

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For comparison, see the leading case of *Birmingham Company* v. *Grover,* 159 Ala. 279. Here the evidence disclosed that a quarry company's employees while performing blasting operations, seriously injured a pedestrian, who sued to recover damages. The higher court promptly held the contractor liable and explained the law as follows:

"If a party who is blasting on his own land knows or has reason to believe that any one is in dangerous proximity to the place where the blasting is being done, it is the duty of the person in charge of the explosive either to prevent the throwing off of material, or to give warning when the blast is about to be made, in order that those in perilous places may seek a place of safety."

Needs No Proof

Another important point of law decided by a leading higher court, is that, generally speaking, a property owner who sues a contractor to recover damages from blasting operations is not required by law to prove "reasons" why his property was damaged.

For instance, in *Estes* v. *Tobin Company,* 153 Pac. (2d) 939, a property owner sued a construction company to recover damages to his residence which he alleged was caused by the concussions of blasting operations.

The counsel for the construction company contended that the property owner should be required to prove what "degree of care" the company's employees should have taken in the blasting operations, and also to prove in what particulars the company's employees failed to use "reasonable care" in setting off the charges.

The higher court refused to agree with these contentions, and held the construction company liable because the testimony indicated that its employees were negligent. In other words, the court implied negligence from the testimony showing the extent of the damage to the private property.

Indirect Injury

Recently a higher court rendered an important decision, which should assist contractors, quarry companies, and others, to avoid liability in many blasting suits. This court held that a contractor who through blasting operations, indirectly effects injuries to private property is not liable in damages.

For illustration, in *Uvalde* v. *Hill,* 175 S. W. (2d) 247, the testimony showed that a contractor's employee, while using dynamite to blast out

rock, set off a blast of such size that it caused a violent concussion which shook the ground and nearby buildings. A cow was so frightened and terrified that she ran against a woman, knocking her to the ground, and trampling upon her. She sued the contractor to recover damages. In refusing to allow the injured woman any damages, the higher court said:

"To our minds, injuries received under such circumstances cannot be said to have proximately resulted from the act of defendant (contractor) in causing this blast or explosion."

Avoid Liability Contracts

Contractors, particularly, should be very careful not to sign construction contracts which contain clauses obligating them for damage liability caused by blasting operations. Without going into detail, it is well to review a late and leading higher court decision which held a contractor liable for excavation and blasting damages because he signed a contract containing a clause which relieved the municipality, for which the work was being performed, from liability.

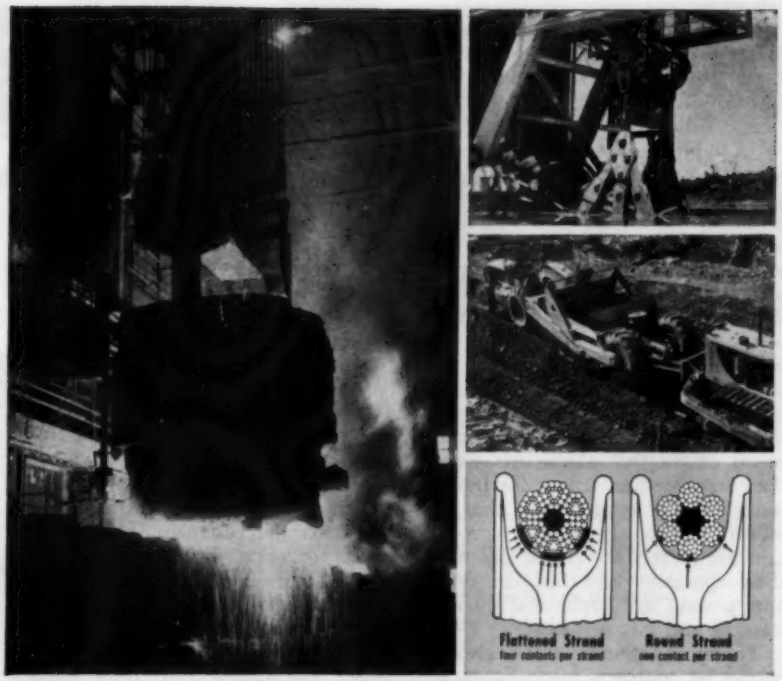
For instance, in *Coley* v. *Cohen,* 45 N. E. (2d) 913, the testimony showed facts, as follows: A contractor entered into a written contract with a municipality for the construction of a sewer. The contract contained the usual clause that the work was to be performed and the materials furnished by the contractor according to specification attached to and made a part of the contract. The contract also contained a clause which stated that the contractor would idemnify the city against all claims "arising from excavation, blasting, or by accidental explosions," whether or not the damage was caused by the contractor's negligence.

Suit was filed against the city by a property owner whose property was considerably damaged by concussions from blasting operations of the contractor during the construction of the sewer. During the trial the city officials introduced before the court the above-mentioned contract. The higher court held that the property owner must sue and recover damages solely from the contractor. Thus the city officials were saved much time, inconvenience, and expense, and the contractor was solely liable.

If the contract had not contained the above-mentioned clause, the city and contractor might have been held jointly liable or the city solely liable.

Must Have Authority

Modern higher courts consistently hold that no contract made by a



How to handle the tough jobs with Hercules Flattened Strand wire rope

When you think you need a super-rope, check Hercules Flattened Strand. This is the wire rope that packs in 10% more steel than round strand rope, making it 10% stronger and safer. It wears longer and more evenly—reduces sheave wear, too.

The 10% extra strength over round strand rope is sometimes the difference between the possible and the impossible. Hercules Flattened Strand frequently does the tough jobs which would otherwise require larger size rope—and without the bother and expense of changing sheaves and drums. The extra strength is useful, too, when shock loading is involved. Saves rope—and money.

If you think that Hercules Flattened Strand wire rope may solve a problem, talk it over first with your Leschen man. He can be reached through your nearby Leschen distributor. His advice is based on the best possible authority—Leschen's long experience and engineering research—the longest in the industry. And with Leschen wire rope you are assured of higher-than-rated quality and longer-than-expected service.

If you can use Hercules Flattened Strand rope you'll be money ahead. See about it soon.

LESCHEN
HERCULES Red-Strand® WIRE ROPE

Depend on Leschen's higher-than-rated quality for longer-than-expected service.

LESCHEN WIRE ROPE DIVISION
H. K. PORTER COMPANY, INC.
St. Louis 12, Missouri

state, county, or city official is valid unless the testimony proves conclusively that the official had legal authority to make the contract. Hence, when considering the validity of public contracts, it is necessary to keep in mind certain fundamental and well founded rules of law. For example, the higher courts have established a legal rule that all persons who who deal with municipal officers must, at their peril, take notice of the limits of the powers both of the municipality and officials who sign the contract.

The reasonableness and necessity of this rule rests upon the ground that municipal corporations are composed of all the inhabitants within the corporate limits; that the inhabitants are the corporators; that the officers of the municipal corporation are merely the public agents of the corporators; and that their duties and powers are prescribed by state statutes and city ordinances.

Therefore, municipalities are not bound by contracts made by an official unless it manifestly appears that he had authority to do the act, or that he was employed in his capacity as a public agent to make the declaration or representation for the municipal corporation. Indeed, this rule of law seems indispensable, in order to guard the public against loss and injuries arising from fraud or mistake, or from the rashnesss and indiscretion of their agents and officials.

See the leading case of *Gontrum v. Mayor and City Council,* 35 At. (2d) 128. Here it was shown that a person named Glover was employed by a city to secure rights-of-way for sewers. Glover entered into a contract with a contractor, a property owner. Glover promised that the city would open a public street through the contractor's property and increase its value if the contractor would grant the city an easement to lay sewer pipe and drains across his property. The contractor granted the easement, but the city did not open the street. Later the contractor filed suit to compel the city to remove its sewerage pipes and drains from the right-of-way and easement, or to open the street. However, the higher court held the city not liable on the contract made by Glover. It was indicated that Glover was "a subordinate official in the sewer department of the city," and that the contractor, in dealing with him in the matter of the sewer right-of-way, could not assume that he had any power to bind the city in any way in connection with the opening of streets. Every contractor is therefore presumed to know the exact nature and extent of the power of municipal officers, and to realize that contracts made by unauthorized officials are void.

Contractor Solely Liable

According to a leading higher court, the contractor or leasee of private property is solely liable in damages for injuries to persons or property caused by blasting operations of the leasor.

For example, in *Tennessee v. Hartline,* 11 So. (2d) 833, it was shown that an owner leased his land to a contractor. A pedestrian was injured when a piece of rock struck him during the contractor's blasting operations. The injured pedestrian sued the owner of the land for $20,000 damages. The higher court refused to hold the owner of the land liable, and said:

"The landlord was not charged by such fact with the knowledge of a nuisance caused by improper blasting without his knowledge or consent."

California Plant Operators Use Rippers for Excavation

Skyline Boulevard, winding south from San Francisco down the peninsula, is a scenic highway atop the ridge of low mountains which shields the numerous residential communities below from the fog and trade-winds blowing in from the Pacific Ocean.

Two commercial aggregate plants have been established in recent years along this highway, both engaged in excavating and processing a medium-hard brown rock, associated with cemented gravels. The Lowrie Paving Company has its plant located just above Milbrae, Calif., having taken over the operation 2 or 3 years ago. A few miles farther south, Skyline Materials Company is operating on a deposit near Belmont, Calif., which it first opened a little more than four years ago.

The raw materials are well consolidated, so much so that it is quite difficult to dig or scrape them with ordinary excavating equipment. Both concerns, therefore, recently turned to the use of Preco back-rippers on the bulldozers of the pit tractors to loosen and load the rock for delivery to the respective processing plants.

These rugged rippers are hinged to the backs of the dozer blades so that they ride up and out of the way when the tractor is dozing material forward. When the tractor "dead heads" on the back-up run, the ripper teeth drop and break out the consolidated material, ready for a full load on the next forward pass.

Back-rippers hinged behind the bulldozer blade drop when the tractor backs up, breaking out the consolidated material.

When the 'dozer moves forward, the ripper teeth ride up out of the way behind the blade.

HAZEMAG Equipment

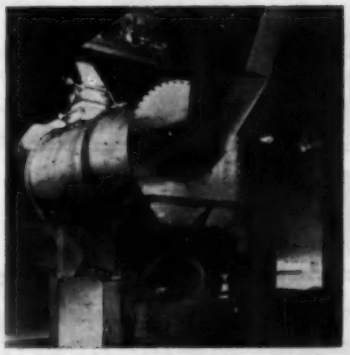
...Star Performers in the Pit and Quarry Field

HAZEMAG Impact Crusher

Over 1000 of these powerful machines are now employed in Europe for installations up to 200 tons per hour. Cement mills alone use over 300 HAZEMAG Impact Crushers.

Many distinctive advantages can be listed:

- Rock lumps in one cu. yd. reduced to 0-1¼" in one operation.
- Extra high percentage of fines in one passage.
- Final product consistently cubical.
- Instantaneous regulation to desired fraction.
- Highest immunity to foreign bodies contained in the feed (pieces of wood, tramp iron, etc.).
- Low power needs, minimum upkeep costs.



HAZEMAG Rapid Dryer

offers large economies in drying any kind of bulk material.

These machines occupy small space, and are easily erected. They operate smoothly, and need only light foundations.

The method of drying by circulating hot gases prevents heat losses, and cuts fuel costs to record low.

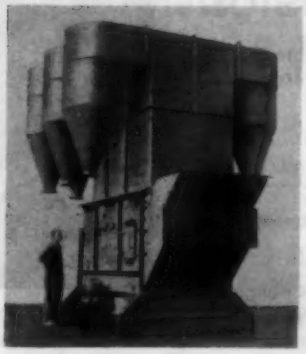
Adaptable to coal, oil, or gas firing, HAZEMAG Rapid Dryers can be located ahead of any grinding plant.

HAZEMAG Dryer-Crusher

simultaneously crushes and dries raw material in one unit.

The high drying effect allows the economical use of industrial furnace gases at relatively low temperature.

Highly successful in new installations, this combination unit saves space and demonstrates large production increases in plants already established.



Complete Plants for Crushing, Drying, Conveying, Dust Removing.

Write for literature and engineering advice.

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The Trimont Corporation Ltd., Suite 709, Castle Building, 1410 Stanley Street, MONTREAL /P.Q./ Canada

Mr. R. E. Kleinhans, International Industries Sales, 122 East 42nd Street, New York 17, N. Y.

HAZEMAG

Hazemag Hartzerkleinerungs-u. Zementmaschinenbau-Ges.m.b.h. • MUNSTER (Westf.). Postfach 34

SAND AND GRAVEL PUMPING CAN BE PROFITABLE

get the facts FREE

Perhaps you've just hit water and are trying to decide whether or not to pump. And, if so, what pump to use.

Or maybe you've been pumping for years but are beginning to question the efficiency of your present installation.

In either case, our experienced hydraulic engineers stand ready to help you . . . absolutely without obligation.

They will ask you to furnish certain basic information about your deposit, location, pumping distance, etc. From this information they will prepare a detailed analysis for you . . . an analysis and recommendation upon which you can make a sound judgment in selecting and installing your equipment.

Take advantage of this *free* service —today! Tear out the coupon and mail it. It may be worth a great deal of money to you.

AMSCO® DIVISION

AMERICAN Brake Shoe COMPANY

Chicago Heights, Ill.

Amsco Division (Pump Department)
Chicago Heights, Ill.

I want a free analysis without obligating myself. Send all information to:

Name_____

Title_____

Company_____

Address_____

trade notes

Huber-Warco Co., of Marion, Ohio—manufacturer of a complete line of graders, tandem rollers, and three-wheel rollers—is announcing the appointment of two divisional sales managers.

Glenn N. Porter of Marion, Ohio, will direct Huber-Warco sales efforts east of the Mississippi in the United States, the eastern half of Canada, and in Cuba. He is a veteran of 35 years' experience in building, selling, and servicing road machinery for Huber Mfg. Co., of Marion, Ohio, now a part of Huber-Warco. He also served as a plant supervisor for Huber, and his last position was district representative for the company.

Joseph D. Whalen of Walnut Creek, Calif., will head Huber-Warco sales activities in the western half of Canada and the United States, Mexico, Hawaii and Alaska.

Glenn N. Porter

Joseph D. Whalen

He last served for four years as district sales representative for the W. A. Riddell Corp. of Bucyrus, Ohio, which recently merged with Huber to form Huber-Warco.

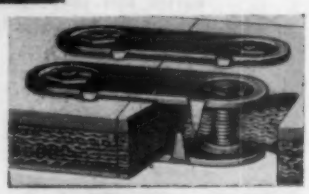
James E. Gleason has been assigned as a conveyor engineer, to the New York office of Barber-Greene Co., Aurora, Ill.

FLEXCO®

BELT FASTENERS and RIP PLATES

FOR HEAVY CONVEYOR AND ELEVATOR BELTS OF ANY WIDTH

- ★ FLEXCO Fasteners make tight butt joints of great strength and durability.
- ★ Trough naturally, operate smoothly through take-up pulleys.
- ★ Distribute pull or tension uniformly.
- ★ Made of Steel, Monel, Stainless, Everdur. Also Promal top plates.
- ★ FLEXCO Rip Plates are for bridging soft spots and FLEXCO Fasteners for patching or joining clean straight rips.



Compression Grip distributes strain over whole plate area

Order From Your Supply House. Ask for Bulletin F-100

FLEXIBLE STEEL LACING CO., 4623 Lexington St., Chicago 44, Ill.

At the annual meeting of the American Institute of Mining and Metallurgical Engineers in Chicago, February 14-17, Edwin Letts Oliver, (left), was presented with the James Douglas Medal for distinguished achievement by Leo F. Reinartz, president of the Institute, as Andrew Fletcher, past-president looked on. Mr. Oliver and John V. N. Dorr, recipient of the Douglas Medal in 1930, are founders and chairmen of recently merged Dorr-Oliver Inc., with headquarters in Stamford, Conn.

The following citation accompanied the Medal — "Edwin Letts Oliver: Noted for his invention of the Oliver continuous filter—a most outstanding contribution to nonferrous metallurgy and widely applicable to industrial fields throughout the world. A man of far-flung interests, a distinguished engineer and administrator, beloved and respected for assistance given to younger engineers."

Choctaw, Inc., of Memphis, Tenn., has been appointed a distributor for the line of Continuflo equipment, manufactured by Pioneer Engineering Works, Inc., Minneapolis, Minn.

Officials of the company are T. B. Daniels, president; W. L. Quinlen, vice-president and general manager; J. L. Nellis, vice-president; and O. H. Miller Jr., secretary.

Edward H. D. Gibbs has been appointed vice-president in charge of sales of Heyl & Patterson, Inc., Pittsburgh, Pa. He joined the company in 1948 as a contracting engineer, serving in that capacity until he became sales manager in 1954.

Norman O. Pierce has been appointed purchasing agent of Lima Works, Baldwin - Lima - Hamilton Corp., Lima, Ohio. He has been associated with the purchasing department since March, 1941, under the late C. F. Alexander, director of purchases.

ECONOMY
Popular 3 cubic yard contractor's body with standard 721-A model hydraulic hoist.
You'll Pocket Far More Savings
WHEN YOU BUY THE BEST!

Insist On MARION BODIES & HOISTS For More Outstanding Performance, Economy Of Operation & Maintenance

When you buy MARION bodies and hoists, you're buying quality, sound engineering and job-proven performance. It's why more and more truck fleet owners are standardizing on MARION equipment.

See your nearby MARION distributor . . . or write direct for literature. We'd welcome an inquiry and the opportunity to give you all the job-proven facts on MARION bodies and hoists.

"Designed on the Job" MARION BODIES AND HOISTS

MARION METAL PRODUCTS CO., MARION, OHIO, U. S. A.

A complete line of standard and special hydraulic hoists and dump bodies to fit every need.

Another quarry drilled with ROK-BITS

Carbide Rok-Bits: Chisel or 4-point—gage sizes; 1¼ to 4".

Intro-Set: Chisel or 4-point—gage sizes; 1⅛ to 2¼".

Carbide Rok-Bits® stand the rapid fire battering of today's rock drilling longer, give greatest service life at lowest cost, at this and other leading quarries nationwide. They drill single gage holes to put more dynamite at the bottom, minimize secondary drilling. Can you afford to waste manpower on less efficient bits? Write plant nearest you for details. Request Bulletin B-1.

Brunner & Lay Products

Brunner & Lay, Inc., 9300 King St., Franklin Park, Ill.

Brunner & Lay Rock Bit Corp., 2514 E. Cumberland St., Philadelphia 25, Pa.

Brunner & Lay Incorporated, 2425 East 37th St., Los Angeles 58, Calif.

Brunner & Lay, Inc., 150 Leslie St., Dallas, Texas

Brunner & Lay Rock Bit Corp., Sweeten Creek Rd., Asheville, N. C.

Brunner & Lay Corp. 600 N. Tillamook St., Portland 12, Ore.

SCHAFFER POIDOMETERS ... used and approved around the world

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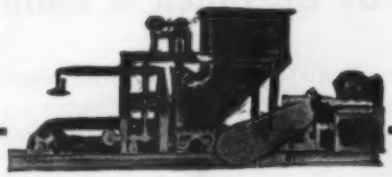
For *Speed* plus *Accuracy* in scaling Bulk Materials

W



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When these automatic machines "take over," producers boost output and cut weighing costs to a new low.

Poidometers assure record efficiency in all scaling operations, including weighing, blending, feeding, mixing, recording, and proportioning.

Rugged, long-service Poidometers are now available with remote control weighing and recording devices, and total weight recorders.

S

OVER 1300 now serving Industry

WRITE FOR CATALOG NO. 5

SCHAFFER POIDOMETER CO.
2828 Smallman Ave., Pittsburgh 22, Pa.

The acquisition of the Thomas Laughlin Co., of Portland, Maine, is announced by John E. Carroll, president of American Hoist & Derrick Co., of St. Paul, Minn. The merger was formerly approved at a special meeting of American Hoist stockholders in St. Paul and of the Laughlin Co., stockholders in Portland. The merger is the first step of a planned expansion program authorized by American Hoist stockholders a year ago.

The Thomas Laughlin Co., more than 50 years old and employing

John E. Carroll

Donald S. Laughlin

250 people, is well established in the forged wire rope accessory business.

All employees at Portland will be retained, and the plant will be operated as the Thomas Laughlin Division of American Hoist & Derrick Co.

Formation of Caterpillar of Australia Pty. Ltd., a wholly-owned subsidiary, has been announced by H. S. Eberhard, president of Caterpillar Tractor Co., Peoria, Ill.

The subsidiary, third foreign company formed by Caterpillar since 1950, will manufacture and sell many of the regular products now built by the parent company, as well as replacement parts for the entire line of Caterpillar products.

Industrial Brownhoist Corp., Bay City, Mich., announces the following promotions:

Warwick J. Hayes Jr. has been named vice-president in charge of sales. He was formerly sales manager.

E. W. Taylor Jr. has been named vice-president in charge of engineering. He was formerly chief engineer.

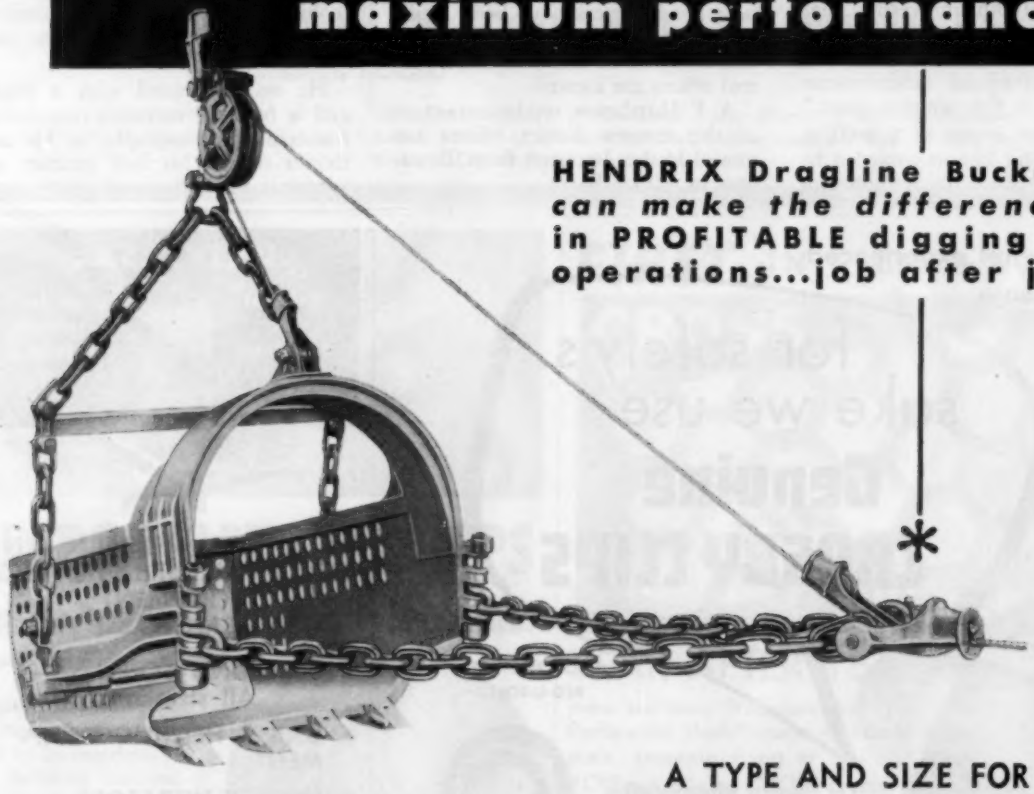
Robert O. Frick has been appointed advertising manager of Philadelphia Gear Works, Philadelphia, Pa. He was employed in the advertising department of The Atlantic Refining Co., The Machine Design Corp., The Chase Aircraft Co., and the E. G. Budd Co., prior to joining Philadelphia Gear Works.

Dirt is cheap

but not to move

unless . . .

your equipment delivers maximum performance



HENDRIX Dragline Buckets *can make the difference* in PROFITABLE digging operations...job after job

¼ to 40 Cubic Yards

Hendrix Lightweight Dragline Buckets

A TYPE AND SIZE FOR EVERY DIGGING PURPOSE

Hendrix Buckets available without perforations

HENDRIX MANUFACTURING CO., Inc.

MANSFIELD, LOUISIANA

David E. Neustadt has been named general sales manager of The W. W. Sly Mfg. Co., Cleveland, Ohio.

Formerly West Coast district manager, with headquarters in Los Angeles, for American Wheelabrator & Equipment Corp., Mr. Neustadt came to Cleveland in 1952 as vice-president and general sales manager of Chas. Rivitz & Co.

David E. Neustadt

Morgan R. Butler

New York University, on the occasion of its 100th anniversary, has cited Morgan R. Butler, president of Butler Bin Co., Waukesha, Wis., for his "professional achievements and services to the common good."

The citation is one of a total of only 100 similar honors awarded by the university since the founding of New York University College of Engineering in 1855.

A 1908 graduate of the New York University, with a degree in civil engineering, Mr. Butler is widely known for his engineering achievements in precision equipment for materials handling—especially in relation to concrete construction of all types.

Joseph T. Ryerson & Son, Inc., a wholly-owned subsidiary of Inland Steel Co. of Chicago, Ill., has acquired the plant and stock of Arthur C. Harvey Co., Boston, Mass., steel and aluminum distributor, according to an announcement by Charles L. Hardy, Ryerson president. Ryerson plans to consolidate its Greater Boston operations at the Harvey plant, Everett St., and Harvey Steel Rd.

Atlas Powder Co. has announced that its eastern district explosives sales headquarters have been transferred from New York to Wilmington, Del., where the company's general offices are located.

A. F. Hutcheson, resident manager of the eastern district offices has moved his headquarters from Tamaqua to Wilkes-Barre.

B. B. Bachman, director of engineering (right) Autocar Division of The White Motor Co., Exton, Pa., is congratulated by vice-president, Edw. F. Coogan (left) on completion of 50 years of service. Mr. Bachman joined Autocar when the main line company was producing automobiles and the era of horseless carriages was just beginning to unfold.

He was presented with a clock and a book of memoirs containing stories and photographs of his activities during his half century of service in the industry.

Here's what experienced riggers say:

for safety's sake we use **Genuine CROSBY CLIPS**

LOOK FOR THE RED-U-BOLT

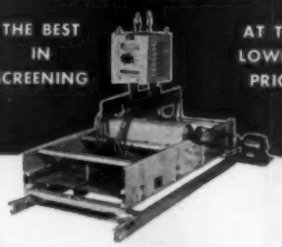
For absolute wire rope safety on the job, insist on CROSBY CLIPS to safeguard men and equipment. They're drop forged for maximum strength and hot-dip galvanized for extra durability.

CROSBY PRODUCTS DIVISION
AMERICAN HOIST AND DERRICK CO.
St. Paul 1, Minnesota

UNIVERSAL

THE BEST IN SCREENING

AT THE LOWEST PRICE



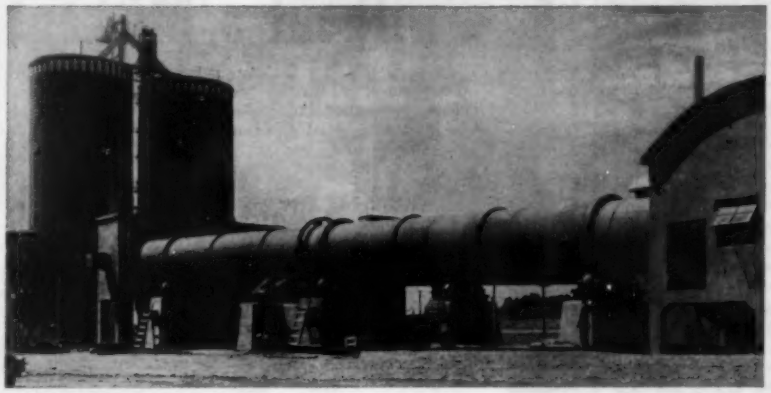
THE MOST MODERN AND EFFICIENT ELECTRIC HEATING EQUIPMENT AT A REASONABLE PRICE

- VIBRATING SCREENS — All sizes and types.
- UNILEC HEATING EQUIPMENT
- UNIFLEX VIBRATORS
- UNIVIBE RIDDLES

WRITE FOR NEW CATALOG No. 150.

UNIVERSAL VIBRATING SCREEN CO.
Racine, Wisconsin
Quality Screens Since 1919

DEPENDABLE KILNS, COOLERS, DRYERS—ANY SIZE SINGLE OR MULTIPLE INSTALLATIONS—GO WEBB



Here are two Kilns 8′ diameter x 125′ long at the Buildex, Inc. plant, Ottawa, Kansas, used for making Light Weight Aggregate. They also have two Rotary Coolers 5′ x 6″ diameter x 50′ long, that work with the Kilns.

The WEBB Corp., pioneering heavy industrial equipment since 1881, is strategically located; well staffed with consulting engineers, skilled mechanics and modern equipment.

- Crushers
- Conveyors
- Scales
- Screens
- Hoppers
- Brick Yard Equipment
- Semi-Drop Bottom Trailers

THE **WEBB** CORP., WEBB CITY, MISSOURI, U.S.A.

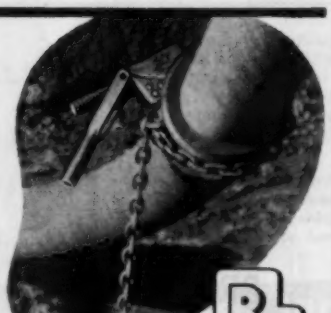
Write for complete information

We are manufacturers of Plate Fabricating Machinery • Truck and Trailer Wheels • Mining Machinery • Railroad, Motor Truck and Industrial Scales • Products for Coal, Mining, Lead and Zinc • Smelters • Brick and Cement Plants • Rock Quarries

DREDGE SLEEVE CLAMPS

Sturdy•Practical•Dependable•Economical

Furnishes a positive seal for round flexible joints. Used by leading dredging and hydraulic sand-and-gravel operators, and the U.S. Engineering Corps. This Multi-use chain sleeve clamp is easy to apply... positive in action. Write for illustrated folder, today.



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9th Ave. at 4th, Mendota, Illinois

FIRST IN SIZING VALUE

YEAR AFTER YEAR . . .

more and more Producers specify CROSS Perforated Steel Screens to insure large-scale, accurate sizing at minimum cost. YOU can rely on CROSS special analysis steel Sections and Decks to provide peak performance in Vibrating, Revolving, and Shaking Screens.

Services of Cross Field Engineer and technical data on request.

Look for this Stamp on all "Cross" Products

the Sign of PLUS QUALITY for PLUS PERFORMANCE

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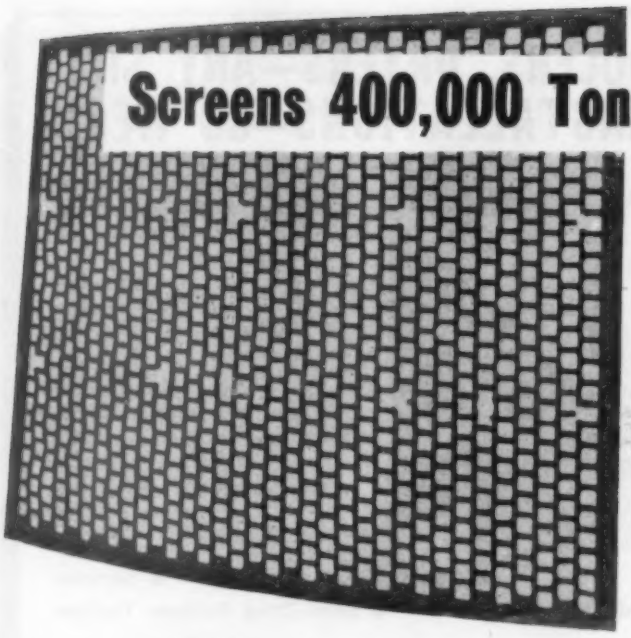

Screens 400,000 Tons of Petersburg Granite without a Mishap!

Here's another success story that typifies Hendrick's ability to manufacture Perforated Metal Screens that take the beatings of constant heavy-duty usage yet afford long service life:

PROBLEM: One of the Virginia quarries of Sunnyside Granite Co. had trouble screening hard "Petersburg Granite." The granite was so abrasive ordinary screens wore out quickly and had to be replaced.

SOLUTION: Hendrick manufactured a screen of ½" thick steel perforated with 1½" square holes. The screen was then heat-treated and double corrugated.

RESULT: Over 400,000 tons of Petersburg Granite passed over this one screen before it had to be replaced.

Hendrick
MANUFACTURING COMPANY
39 DUNDAFF STREET, CARBONDALE, PA.
Sales Offices in Principal Cities

Hendrick Perforated Plate used on vibrating and shaking screens can often mean the difference between profit and loss. To see how you can best benefit from Hendrick's long experience in manufacturing screens for the quarry industry, call your nearby representative today.

Perforated Metal • Perforated Metal Screens • Wedge-Slot Screens • Architectural Grilles • Mitco Open Steel Flooring • Shur-Site Treads • Armorgrids

AUTO VORTEX CLASSIFIERS
FOR THAT
BULGE
in the
MIDDLE
OR
MINUS 50
DEFICIENCY

The Charles E. Wood Company has a considerable reputation for treating these and other Sand Classification ailments in plants throughout the country. A Wood Consulting Service is available to diagnose your gradation problems, whether your tonnage is large or small, and however exacting your specifications. Write for our bulletin on Cone and Bowl type Auto-Vortex Classifiers!

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Contract Core Drilling

Exploration for coal and other mineral deposits. Foundation test boring and grout hole drilling for bridges, dams and all heavy structures.
Core Drill Contractors for more than 60 years

JOY MANUFACTURING CO.
Contract Core Drill Division
MICHIGAN CITY, INDIANA

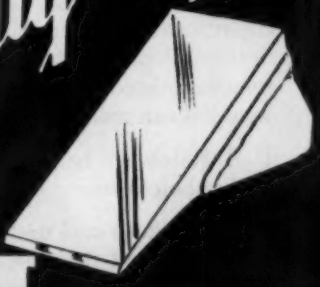
For Fast Results . . .

ADVERTISE YOUR
USED EQUIPMENT
IN PIT AND QUARRY'S
BROADCAST SECTION

"The Marketplace of the Industry"

H&L

Teeth that really dig!



H&L TOOTH CO.

1540 SO. GREENWOOD AVE., MONTEBELLO, CALIF.

LOW COST CRUSHING POWER

for fast "secondary breakage"

use FREDERICK CAST semi-steel BALLS with E-Z Swing Steel Eye

Tough and rugged, Frederick Wrecking Balls deliver crushing power where you need it. They're made to stand abuse—to give you long, economical service. Inverted steel eye gives cable protection plus free-swinging action. Special release hooks for free dropping also available. Shipments made promptly from stock of these sizes: 500 lbs., 1000 lbs., 1500 lbs., 2000 lbs., 3300 lbs., 4000 lbs., 5200 lbs., 6500 lbs., 8000 lbs.

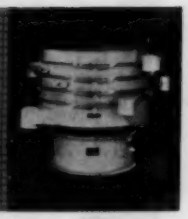
Write today for prices and free literature on our new line of Balls and Cable Weights . . . or phone for prompt delivery.

FREDERICK IRON & STEEL, INC.

FREDERICK Since 1890 MARYLAND

CENTRIFUGAL PUMPS • MUNICIPAL & GRAY IRON CASTINGS

SCREENING NEWS



Helpful information on screening and separating operations . . . from field reports of **SWECO SEPARATOR** *District Engineers*

SWECO saves $100 per day for limestone manufacturer

This plant processes ground limestone at an average rate of 20 tons per hour and specified 10 tons per hour through 34 mesh. Four 48" SWECO Vibrating Screen Separators were installed with 34 and 42 mesh stainless steel screens. The SWECO District Engineer reports reduction of a 70 per cent recirculating load to 40 per cent, using a 10 mesh scalping screen. The SWECO installation increased throughput capacity from 1¼ to 2 TPH per unit. Daily working time has been cut from 18 to 14 hours at an estimated saving of more than $100 per day.

98% screening accuracy on sized grades of silica sand

Crystal Silica Company has a quarter-century old reputation for producing only the most accurately sized grades of silica sand. The Company now uses 21 48" diameter, multi-decked SWECO separators to produce five different grades, from minus 10 to minus 60, with 98% accuracy. SWECO installations have increased Crystal's screening capacity 50% in the past two years. Average life of stainless steel screens is 200 days on a 24-hour, 7-day week production schedule.

SWECO boosts screen life to six months on cement slurry

A Texas cement company reports that the replacement life on 24 mesh screens for its cement slurry screening operation has been increased to six months. The company uses a SWECO A-1D vibrating screen separator between the ball mill and tube mill. Minus 24-mesh slurry goes to the tube mill for further grinding, and the oversize is returned to the ball mill for regrind. In 18 months the SWECO unit has set new records for output efficiency and screen replacement life.

Free screening analysis and recommendations . . .
SWECO *District Engineers are available to make detailed analyses and recommendations on specialized screening operations without cost to you.*

SEND FOR BULLETIN No. 51-6
Detailed information on applications of SWECO *Screen Separators.*

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(2) Inherent stretch is worked out beforehand in the factory, yet enough elasticity is retained to enable the V-Belt to take the heaviest shock loads.

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APRIL 1955

THE CONCRETE MANUFACTURER

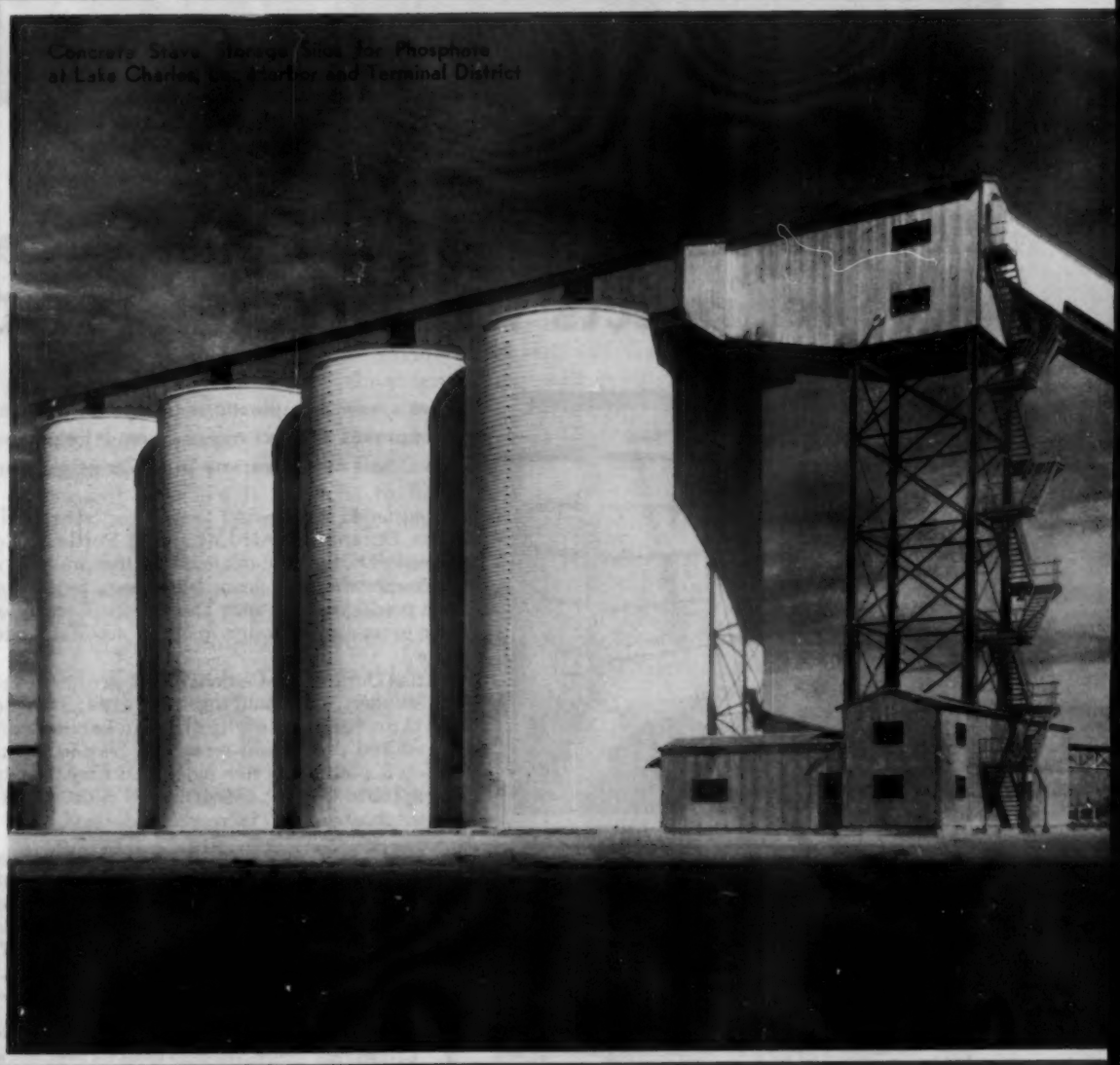
A SPECIAL SECTION OF PIT AND QUARRY

Edited for Producers of

Concrete Building Units

Pipe

Ready-Mix Concrete

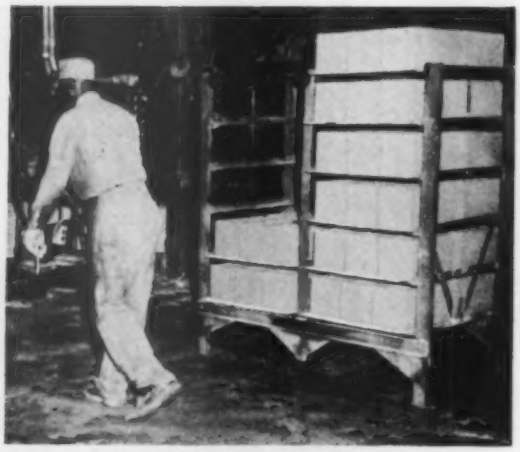


Concrete Stave Storage Silos for Phosphate at Lake Charles Harbor and Terminal District

GOOD APPEARANCE BUILDS SALES and Duraplastic-made products like these at Pre-Cast Concrete Products, Inc., Chicago Heights, Ill., feature rich texture and clean, true edges for customer appeal.

PRODUCTS MANUFACTURERS REPORT:

Richer face texture . . . cleaner edges . . . fewer rejects with DURAPLASTIC*



MIXES MADE WITH ATLAS DURAPLASTIC CEMENT feed easily through this block machine at Pre-Cast Concrete Products, Inc. Less breakage and fewer culls mean lower production costs . . . higher profits for manufacturers.

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Here's how Duraplastic cement trims production costs and improves product appearance . . . helps you make and sell more concrete products at greater profits

It's *easier* to sell cleanly formed concrete products made with Atlas Duraplastic Air-Entraining Portland Cement. Smooth, cohesive Duraplastic-made mixes give products sales-promoting good appearance – clean, true edges, plus richer face texture. And products made with Duraplastic Cement offer high resistance to passage of water, another important sales point in your favor.

Atlas Duraplastic Cement means greater economy, too. Mixes are "rubbery" and hold together better. This means fewer culls and throwbacks . . . less breakage in handling of green products . . . reduced production costs and greater profits for you.

You'll produce better block and other products with Atlas Duraplastic Cement. Mixes made with it feed easily through the machine . . . help increase production.

YET DURAPLASTIC COSTS NO MORE than regular cement! Requires no unusual changes in procedure. Complies with ASTM and Federal Specifications. Write for descriptive booklet. Universal Atlas Cement Company (United States Steel Corporation Subsidiary), 100 Park Avenue, New York 17, N. Y.

"Thrifty" says: Atlas Duraplastic Cement cuts costs and boosts profits by decreasing breakage and reducing the number of costly culls and throwbacks.
"Nifty" says: Sales and good appearance go hand in hand. Customers go for the clean, true edges and richer texture of Duraplastic-made products.
*"Duraplastic" is the registered trade-mark of the air-entraining portland cement manufactured by Universal Atlas Cement Company.
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The CONCRETE MANUFACTURER

APRIL 1955

Be a Good Neighbor

THE ready-mixed concrete, concrete block, concrete pipe, and other related industries are all profiting from the continuing home-building boom which promises to go on indefinitely. Most of these products are used in the homes themselves; concrete pipe is used to provide sanitary facilities to new subdivisions; septic tanks are used for homes more remotely located. What some producers may not realize, however, is the fact that this same boom may be a serious threat to the existence of their businesses, or at least to their continuation in their present locations.

Most of these plants were originally located on the outskirts of towns or cities, or inside their limits in areas either zoned for industry or otherwise undesirable for residential purposes. In recent years, however, subdivisions have been built up around every city and town, and homes are filling in many of the areas formerly passed up for choicer locations. As a result plants formerly located far from any homes are now being surrounded by them, and many will eventually be forced to move out because of objections to noise, dust, heavy trucking, etc. The fact that an industry was there first, or that the area is zoned for such industries, is no safeguard as an area can usually be reclassified if enough pressure is brought to bear. The relationship between a company and its neighbors is extremely important in such cases.

A number of far-sighted producers have long been aware of the importance of good neighborhood and public relations and have done everything possible to promote such relations. They have found this to be good business and have profited thereby. Others, however, have been unaware of, or indifferent to, the need for public good will. Many of these producers are paying for their mistakes.

Dust is one of the chief reasons for complaints but it is also one of the easiest problems to solve. Dust collectors, equipment enclosures, and wetting agents are among the solutions to this problem. Every producer can readily find means for greatly reducing, if not completely eliminating this nuisance.

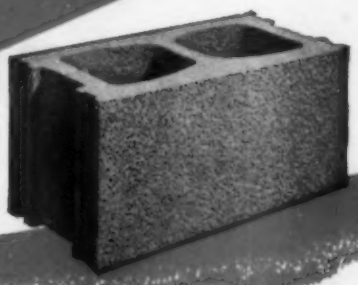
Noise is another serious problem about which little has as yet been done and which is much more difficult to solve; but much can also be done about it.

Heavy trucking is usually only objectionable when drivers are careless and endanger children and other traffic on their way in and out of these plants. Truck drivers must be taught to respect the rights of others; and there is no better advertisement than a clean truck and a careful driver.

What is needed is the co-operation of all producers in eliminating so far as possible every nuisance. By doing so they will not only improve relations with their neighbors and prolong their own existence; they will also make their plants more attractive to their workers, with a resulting decrease in labor troubles and turnover.

Walter E. Trauffer

Only a Besser Vibrapac is *Fully CAM OPERATED!*



Illustrating the cam and roller principle of the Besser Vibrapac. Only a few moving parts. You get high production with these slow, revolving cams and long machine life.

Many concrete block plants are now running on a 24-hour a day schedule of uninterrupted production, day-in and day-out. This is made possible by the exclusive Besser cam and roller principle of power application which assures smooth, continuous operation.

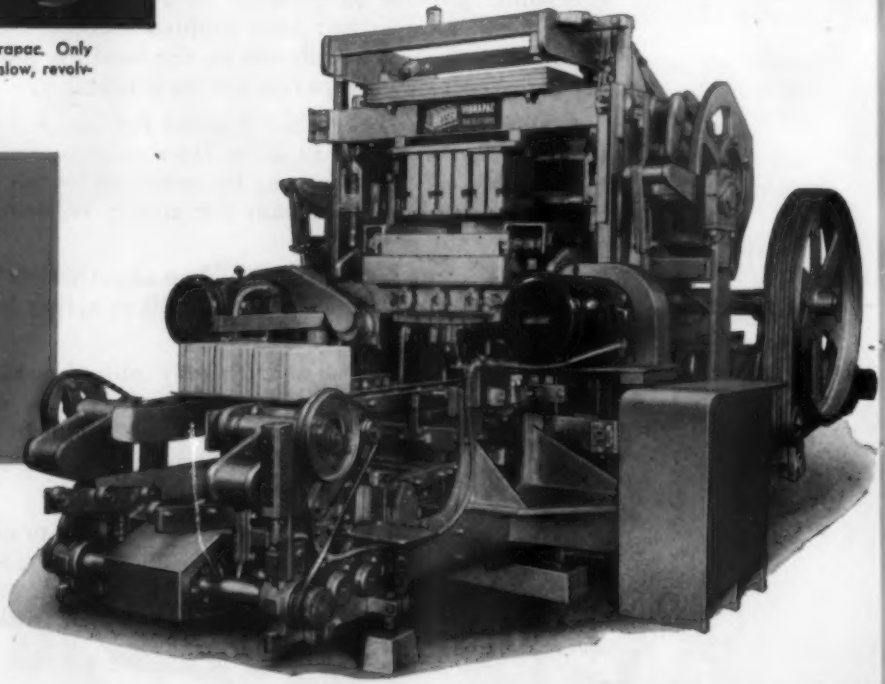
The rugged steel cams and heavy duty alloy steel rollers and large diameter shafts provide an exceptionally long service life and dependability. The cams are machined from a single piece of steel having a thickness of 2". The entire wearing surface is heat treated and hardened.

Let's examine a Vibrapac. You'll find there are no pistons . . . no valves . . . no leaking liquid . . . no interlocked operations. One operation does not trip the next. Each one is perfectly timed. There are no lost motions between the various operations of feeding . . . vibration . . . striking off surplus concrete. . . stripping finished block . . . delivering finished block to front of machine . . . and placing new pallet under mold. This accounts for the unusually high production of uniformly high quality block.

Only a Besser Vibrapac is fully cam operated. The rugged simplicity of the Besser Cam and Roller principle of operation is one of the greatest contributing factors to the universal acceptance of the Automatic Vibrapac.

A CAM has a Perfect Memory!

The cam and roller principle of operation is the simplest method of power application. A slow revolving cam, with a roller riding on its surface, actuates an arm that delivers power with pin point precision and with steady, uninterrupted regularity. A cam virtually "thinks" for you . . . has a perfect memory.



Front Pallet Feed Vibrapac
— the modern, fully automatic concrete block machine. Produces three 8" x 8" x 16" modular units at a time on one plain pallet. Other sizes produced in equivalent multiples on the same set of plain pallets. No machine operator is required. Hand labor is reduced to pushing a switch button and guiding a power offbearing hoist. One man removes finished block, and, with no lost motion, returns empty pallets to the Vibrapac.

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BESSER COMPANY

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Complete Equipment for Concrete Block Plants

news of the concrete industries

Mid-West Concrete Show Presents New Equipment, Highlights Latest Trends

At a three-day meeting held February 24 to 26 at the Navy Pier, Chicago, the Mid-West Concrete Exposition, sponsored by the Contractors Association of Greater Chicago, presented a varied and stimulating program of panel discussions on new developments in the use of concrete. Held concurrently with the talks was the exhibition highlighting new equipment, tools, and materials in the concrete field.

James T. Lendrum, director, University of Illinois Small Homes Council, conducted two forums on residential concrete. Floor systems, flat work, basements, crawl space, and other residential uses of concrete were covered. Another session entitled *The Architect Looks at Tilt-Up Construction* was presented by four prominent architects, including Roy Christiansen of Quinn and Christiansen, Charles Rommel of Naess and Murphy, Carl Metz of Shaw, Metz and Dolio, and John Bartolomeo of Bartolomeo and Associates.

A two-part session devoted to formal papers and discussion on the subject of the design and construction of thin-shell concrete roofs was held on February 25, in which the participants were Felix Candela, Minoru Yamasaki, George Bishop, Anton Tedesco and Verne Ketchum, all authorities working in this field.

Customer relations in the ready-mixed concrete industry was the topic covered in a panel discussion in which the following participated: John Rudolph, Concrete Supply Co., Evansville, Ill.; James Wiggenton, Evanston Fuel and Material Co., Evanston, Ill.; William Avery, *Concrete* magazine, Chicago, Ill.; William Ryan, Consumers Co., Chicago, Ill.; and M. J. Gehle, Material Service Corporation, Chicago, Ill.

Prestressed Concrete Meeting Scheduled at Ft. Lauderdale

The Prestressed Concrete Institute, a national association of prestressed concrete manufacturers, will hold its first annual meeting at the Lagamar Hotel, Fort Lauderdale, Fla., on April 21 and 22.

According to word from the institute's headquarters in Lakeland, Fla., the program will include a round table on manufacturing problems, talks by experts in the prestressing industry, and a field trip to the pretensioning plant of R. H. Wright & Son at Pompano Beach.

Members of the concrete industry, engineers, and architects are invited to attend the two-day meeting. Additional information may be obtained by applying to the secretary, Prestressed Concrete Institute, Box 495, Lakeland, Fla.

Coming Events

April 21-22, 1955—Fort Lauderdale. First annual meeting, Prestressed Concrete Institute. Lagamar Hotel.

June 26- July 1, 1955—Atlantic City. 58th annual meeting, American Society for Testing Materials. Chalfonte-Haddon Hall.

Nitterhouse Gets Franchise To Manufacture Marblox

Marble Face Blocks, Inc., Kenilworth, N. J., has granted a franchise for the manufacture and sale of Marblox to Nitterhouse Concrete Products, a firm which operates plants in Johnstown and Chambersburg, Pa.

Addition of this item to the Nitterhouse products rounds out the firm's line of concrete masonry units. The Chambersburg plant turns out concrete joists, long and short span channels, prestressed block beams and girders, and precast lightweight (Zonotile) roof plank.

Concrete Silo Staves Transported 2000 Miles By Barge to Job Site

An unusual aspect in the construction of eight concrete stave silos recently erected at Lake Charles, La., was the fact that the staves were transported 2,000 miles *via* barge. The producer, Marietta Concrete Corporation, Marietta, Ohio, sent more than 1,000 tons of staves to the site over inland waterways.

These silos, which form a part of the self-sustaining Lake Charles Harbor and Terminal District, are 30 ft. in diameter and 70 ft. in height; and they provide a total storage volume of 40,000 cu. yd. The silo installation was planned to increase the tonnage of various materials handled through the port and to provide farmers in the Southwestern states with low-cost fertilizers.

Barges are used to transport the rock from Florida to Lake Charles. At its destination the rock is unloaded into the silos *via* conveyor belts. It is taken from the silos as needed, crushed, and loaded into railroad cars for shipment to fertilizer plants in the South.

A secondary use of the plant is for storing and processing barytic ore, used in oil well drilling.

Contractors on the work, designed by F. Shutts' Sons, Lake Charles, La., include in addition to the Marietta Corp., the Raymond Concrete Pile Co., piling; Hewitt-Robins Co., conveyors; and the Raymond Mill Co., crushers. Erection of the silos required only 60 days. Installation of rock crushing machinery and ore conveying belts followed.

● A string of barges carrying concrete silo staves on the 2,000-mile trip from the plant at Marietta, Ohio, to the erection site at Lake Charles, La.

Oregon Unit Masonry Assn. Names Smallen President, P. L. Nutt Vice-President

Montie Smallen, Portland (Oreg.) mason contractor, was elected president of the Unit Masonry Association of Oregon at a recent general meeting of the association in Portland. Other new officers are as follows: vice-president, Paul L. Nutt, sales manager, Smithwick Concrete Products; secretary, Ralph Holin, business representative, Bricklayers Union No. 1 of Oregon; treasurer, Glen Tiddyman, sales representative, Masons Supply Company.

The Unit Masonry Association of Oregon was formed last year to join all segments of the masonry industry together, to raise the standards and quality of workmanship and materials to highest possible goals, and to inform the general public of the features of masonry products. Unit Masonry Assn. members include bricklayers, mason contractors, and manufacturers and suppliers of masonry materials.

Robert J. Rawlings, 61, president and owner of Concrete, Inc., Covington, Ky., died in a local hospital after a short illness. Mr. Rawlings founded his firm in 1946.

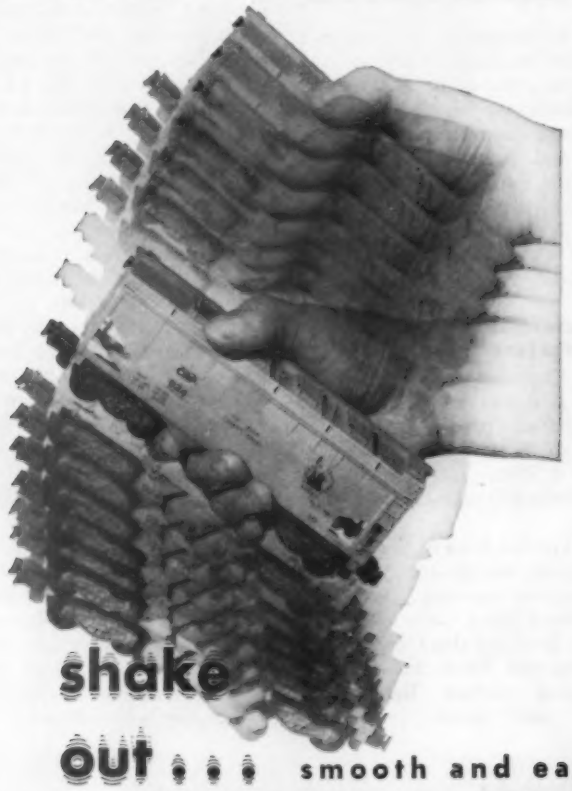
● Joseph P. O'Neill Jr. of Rainbow Rock Division, General Engines Company, receiving a plaque to commemorate his firm's prize winning booth at the Philadelphia Home show, sponsored by the Home Builders Association of Philadelphia. Joseph Sheen of the Home Builders Association is presenting the plaque. Looking on was Miss Jerry Fredricks, interfraternity queen of Drexel Institute of Technology, who served as hostess at the concern's exhibit.

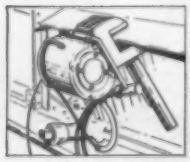
Concrete Pipe Firm Is Hub Of Israeli Irrigation Project

The Yuval Gad pipe plant of Israel is playing an important part in developing the agricultural renaissance in that new land's bid for economic independence. Israel's vast irrigation program, so necessary for the productivity of the land, is dependent on the output of pipe from this plant.

Located in the industrial zone of Migdal Ashkelon, the plant occupies 35 acres and is operated 24 hours a day. It employs about 850 workers and manufactures prestressed concrete cylinder pipe 30-, 36-, 48-, and 66-in. in diameter and 16 ft. long. In addition, the management expects to produce other pipe sizes and prestressed concrete railway sleepers in the future. The Lock-Joint Pipe Company of America and the Societe des Tuyaux Bonna of Paris by agreement made special patents and manufacturing methods available to the Israeli firm.

Block Plant Chatter is the name of a neat little house organ published by the Bergen Machine & Cool Company, Inc., Nutley, N. J., makers of block plant equipment. In addition to several pages of shop talk, there is a "swap department"—a clearing house for used machinery and equipment.





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● An unusual and successful application of Flexicore slabs is seen in this sidewalk replacement section in Dayton, Ohio, which the contractor had open for traffic within 72 hours of the time the old walk was torn up. On the day after the section had been prepared by the crew, the prefabricated slabs were put in place, and grouting was done; on the third day membrane waterproofing was applied and a 4-in. top slab of concrete was poured; on the morning of the fourth day the walk was opened to pedestrians.

Had the conventional method been used, underground supports would have obstructed the basement below for two weeks; the use of slabs obviated this inconvenience. Since the slabs bear on existing stone walls, no additional beams were needed. Moreover, the job was also accomplished at a considerable saving over the cost of a poured job.

Fly Ash Effect on Concrete Told in N.R.M.C.A. Booklet

Results of tests on concrete using five different fly ashes from various parts of the country were published recently by the National Ready Mixed Concrete Association, in its 36-page publication No. 48, *Effect of Fly Ash in Concrete* by Delmar L. Bloem, assistant director of engineering, N.R.M.C.A., Washington, D. C. The tests had been made at the University of Maryland in connection with six investigations on this subject conducted in the joint research laboratory under the direction of Stanton Walker, director of engineering, N.R.M.C.A.

The five fly ashes varied relatively little in composition and fineness, yet had significantly different effects when used in concrete. The report emphasizes that the generally accepted criteria of silica and carbon content and fineness alone are not sufficient to indicate quantitatively the effects of fly ash, and concludes that any particular fly ash to be used must be investigated to evaluate the product. Other conclusions reached were as follows:

(1) Replacement of cement with fly ash reduces strength at 7 and 28 days. At later ages, strength equal to or greater than normal concrete may be obtained with *some* fly ashes.

(2) When fly ash was used as an admixture, cement was about 5 times as effective in improving strength at 7 days, 3 times as effective at 28 days, and 1 1/3 times as effective at 3 months.

(3) From the standpoint of strength alone, fly ash will seldom provide worthwhile economies for concrete construction.

(4) Fly ash suppresses entrainment of air, four times the normal amount being required to entrain the same amount of air as in concrete without fly ash.

(5) Sulphate resistance is improved with *certain* fly ashes.

(6) Alkali-aggregate reaction is inhibited by *certain* fly ashes, but all such are less effective in this respect than other pozzolans.

(7) The use of *certain* fly ashes may be advantageous for reasons other than their effect on strength; in such cases they should be considered *admixtures,* rather than substitutes for portland cement.

Copies of the publication can be obtained from the N.R.M.C.A., 1325 E Street, N.W., Washington 4, D.C.

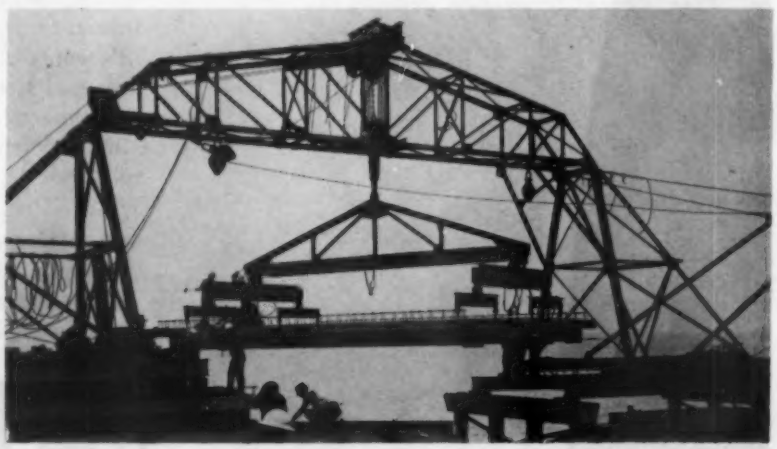
Imperial Const. Equip. Opens New Northlake, Ill., Plant

The Imperial Construction Equipment Company, a division of the Imperial Flooring and Waterproofing Company, has gone into production at its new plant in Northlake, Ill., a suburb of Chicago. The firm manufactures and sells truck mixers, concrete block unloaders, and concrete plant controls.

This concern formerly operated a ready-mix plant in Melrose Park, Ill., which has since been sold to the Material Service Corporation. Imperial helped to introduce ready-mix in the Chicago area and developed the Hydrocreter, the first hydraulic truck engine-drive mixer with a completely automatic hydraulically-operated chute.

Imperial also has developed the Tel-A-Slump, a device for determining the consistency of concrete, which is now being marketed.

Election of Robert W. Condon, manager of the Seattle plant of the Graystone Concrete Products Company, to the firm's board of directors has been announced by President F. M. Kettenring.



● An action shot shows a 65-ton concrete roadway slab, poured by the Radcliffe Gravel Company, Mobile, Ala., being handled by a crane during the construction of the Dauphin Island Bridge. These slabs, 342 of them, were poured into re-usable steel forms set on barges and carried by water from the plant to the job site, a distance of 27 miles. In contrast, the mixer trucks at the plant had a run of only about 75 ft. from the batching bins to the dockside. Curing of the slabs enroute was an unusual feature of the operation.

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Why it's BEST *to* INVEST *in modern* UNIT *models*

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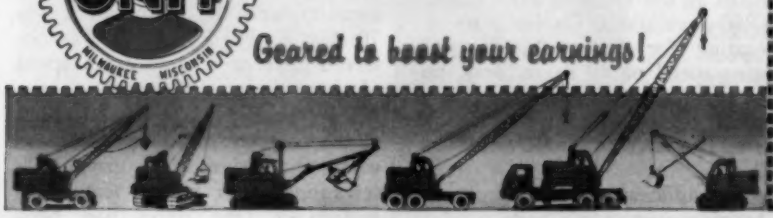

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R_x Ready Mix

By Harry F. Thomson

Beware of Over-Mixing

BOTH under-mixing and over-mixing are to be avoided in producing quality concrete. The objection to under-mixing is self-evident, as a substantial amount of intermingling of the cement, sand, and coarse aggregate with the mixing water is necessary to obtain a uniform mass of concrete. But the effect of over-mixing is not so readily apparent, and consequently much concrete is "damaged" in that its characteristics are modified through carelessness in not observing reasonable limits to the amount of mixing a batch receives.

The safe limits for both minimum and maximum are stated in the *A.S.T.M. Specification for Ready Mixed Concrete,* designation C 94-54T, based on conservative experience with average materials at normal temperature. This specification provides as follows:

Section 9—Mixing and Delivery

(e) When the concrete is mixed in a truck-mixer loaded to its rated capacity, the number of revolutions of the drum at *mixing speed* shall be not less than 50 nor more than 100. If the volume of the batch is greater than the rated capacity (limited by provisions elsewhere to 10 percent greater), the number of revolutions of the drum shall not be less than 70 nor more than 100. *All revolutions after 100 shall be at agitating speed.*

(f) When a truck-mixer or agitator transports concrete that has been completely mixed in a stationary mixer, mixing during transportation shall be at the speed designated—at *agitating speed.*

(g) When a truck-mixer or agitator is used for transporting concrete, the concrete shall be delivered to the site of the work and discharge completed within 1½ hours after introduction of mixing water to the cement and aggregates. (There is also provision for longer or shorter elapsed time under special conditions.)

The 1953 Standards of the National Ready Mixed Concrete Association for Operation of Truck Mixers and Agitators provide that the *mixing speed* of the revolving drum-type mixer "shall be not less than 4 r.p.m. nor greater than a speed resulting in a peripheral velocity of the drum of 225 f.p.m." For current types of high-discharge mixers of 4½ cu. yd. or greater rated capacity, this maximum speed is 10 to 12 r.p.m. Also, *agitating speed* is defined as "not less than 2 nor more than 6 r.p.m. of the drum." These same provisions for drum speeds are contained in the current standards of the Truck Mixer Manufacturers Bureau.

Thus the drum speeds for revolving-drum mixers permitted under the A.S.T.M. specification for ready-mixed concrete are—

Mixing speed—4 to 10 or 12 r.p.m., limited to 100 revolutions.

Agitator speed—2 to 6 r.p.m. for entire haul as agitator of central-mixed concrete or after 100 revolutions as truck-mixer.

What do these provisions mean as to timing in practical operation? Merely that:

(1) Maximum mixing at a fast speed of 10 r.p.m. is 5 minutes for a noted capacity batch or 7 minutes for a batch of 10 percent in excess of the rating.

(2) Maximum use of mixing speed is limited to 10 minutes for fast mixing at say 10 r.p.m., or to 25 minutes at slow mixing speed of 4 r.p.m.

(3) Maximum revolutions of an agitator at typical agitating speed of 4 r.p.m. in the 1½-hour limit would be 360 revolutions. Or for a mixer operating for 100 revolutions at mixing speed of 10 r.p.m. and the balance of delivery time up to 1½ hours at agitating speed of 4 r.p.m., the maximum revolutions would be 420.

After sufficient mixing to obtain a homogeneous mass, there is little change in the characteristics of the concrete (such as slump and strength), with reasonable additional mixing, assuming normal temperature and aggregates of typical hardness. But as mixing continues, there is a gradual stiffening of the mass, depending on various conditions. This stiffening, which is commonly referred to as "loss of slump," is due (1) to the amount of heat generated by the hydration of the cement and (2) to the grinding of the cement and aggregates. The rate of stiffening may differ with cements; but for a given cement the rate will be influenced by the violence of the mixing—slower for slow r.p.m. of the drum and faster for high r.p.m.

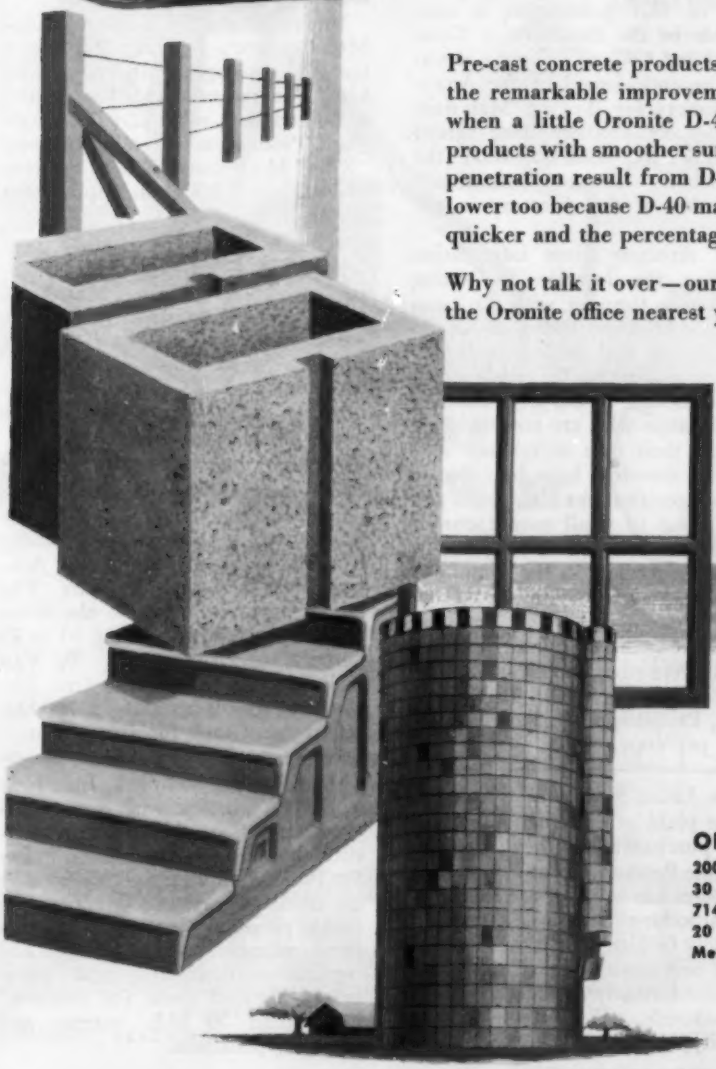
The amount of grinding action of the aggregates and cement is often overlooked, but it should not be neglected, especially with the softer aggregates as the production of additional fines may be considerable. Any increase in the total surface and of the solids in the mix requires more water for surface wetting, and reduces the remaining water available for lubrication between particles in the mass. The comment has been made that "a drum mixer with blades is an excellent ball mill for producing fines." To hold the rates of stiffening of a load to the minimum the A.S.T.M. specification, as noted above, provides that after 100 revolutions at mixing speed, any additional mixing should be at slow agitating speed.

To obtain uniformity of consistency in successive loads for a given job, it is important that the numbers of revolutions at mixing speed and at agitating speed should be regulated. This control is especially important on long hauls, and emphasis should be given to guarding against over-mixing at fast speed (*i.e.,* beyond the 100 revolutions just mentioned) on such hauls.

The effects of prolonged mixing were included in the extensive tests of truck-mixers conducted by the National Ready Mixed Concrete Association in 1952. Detailed data for these were published later by Stanton Walker and D. L. Bloem. The mixes were 5½ cu. yd. rated capacity, and the temperature was 70 deg. to 80 deg. F. It was observed that at a slow drum speed of about 4 r.p.m. there was no significant change in the characteristics of the concrete up to about 1 hour, when the drum had turned 100 revolutions after mixing water was introduced (the drum had been

Better pre-cast concrete products at lower operating costs

with only an ounce or two of low-cost D-40 per bag of cement!



Pre-cast concrete products manufacturers are rapidly discovering the remarkable improvement of product quality that's possible when a little Oronite D-40 is added to the mix. More uniform products with smoother surfaces and greater resistance to moisture penetration result from D-40 mixed concrete. Operating costs are lower too because D-40 makes mold stripping so much easier and quicker and the percentage of rejects goes way down.

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stopped three times for taking samples); between 1 and 2 hours there was considerable falling off in slump; after 300 revolutions (at the end of 2 hours) the slump was very low and was raised only moderately by re-tempering with 3 gal. of water per cu. yd.

In comparison, at a fast drum speed of about 11 r.p.m. there was no difference in consistency after 7 and 20 minutes (20 and 60 revolutions); but after 40 minutes (200 revolutions) there was a decided reduction in slump, and after 80 minutes (500 revolutions) the concrete was very stiff. The drum had been stopped several times during this period for taking samples.

The authors concluded that for a given number of revolutions the effects were about the same for both slow and fast mixing speeds up to something less than 200 revolutions. This means that a longer period of mixing in point of time can be accepted if the speed is kept low.

The problem of accomplishing the range of mixing speeds contemplated in the A.S.T.M. specification deserves more serious consideration by ready-mix producers than it commonly receives. In truck-mixing the requirement of drastically reducing the drum speed after 100 revolutions may be difficult to meet. With the newer type of electrically operated revolution counter, the recorder can be mounted in the cab so that the driver may be informed when the drum has turned the 100 revolutions. On mixers equipped with "truck engine drive" through either a mechanical power-takeoff or by hydraulic pump, the control for the p.t.o. is usually brought into the cab, which enables the driver to shift the drum-speed easily. With mechanical p.t.o. a 2-speed unit is desirable.

But on mixers equipped with separate engine drive as commonly installed the driver does not have convenient control, as the mixer engine throttle is usually outside the cab. In that case, shifting the drum speed requires the driver to stop the truck and leave the cab to change the rate of turning. The driver will seldom do this; and if he does, there is resultant expense through loss of truck time. Furthermore, as most such mixers are now equipped, the range of changing the drum speed is limited to the range of the throttle control of the engine speed, because a single-speed transmission between the engine and drum is usually installed. This type of unit is probably favored by the mixer manufacturers because it is self-contained and can be mounted on the truck by merely bolting the sub-frame to the chassis. But from the standpoint of the ready-mix producer, he would be in better position to deliver uniform concrete if the current mixers had two additional features: (1) a 2-speed transmission and (2) controls in the cab for both engine speed and transmission gear shift.

Here is a possible improvement in truck-mixers with separate engine drive which might well be considered by both mixer manufacturers and their customers, the ready-mix producers.

A.S.T.M. Issues Directory Of Testing Laboratories

National Bureau of Standards Miscellaneous Publication M187, *Directory of Commercial and College Laboratories,* has been withdrawn from circulation. An up-to-date revision of this publication is now available in the *Directory of Commercial and College Testing Laboratories,* recently issued by the American Society for Testing Materials. The two organizations have agreed that A.S.T.M. will undertake the responsibility for compilation and publication of the directory in the future.

The directory gives information regarding the location of testing laboratories, together with the types of commodities and the nature of the investigations each laboratory is prepared to undertake. It is designed to be of assistance to the large number of purchasers who are not equipped to make their own acceptance tests and who therefore have hesitated to buy on specifications. It should also be of value to small manufacturers and others who are seeking testing laboratory services in the evaluation of raw materials and finished products.

The new directory may be obtained from the American Society for Testing Materials, 1916 Race Street, Philadelphia 3, Pennsylvania, at $1 per copy.

The Lakeside Gravel Company's mortar plant at Bellevue, Wash., has been purchased by the Graystone Concrete Products Company, Seattle. The plant has been moved to a location adjoining Graystone's concrete products facility, and it is being enlarged and modernized. Carl Anderson, who formerly operated the plant for Lakeside, will continue in that capacity for Graystone.

● Ray Wimer, 1955 president of the Oregon Building Congress and retiring president of the Unit Masonry Association of Oregon, presents Guildsman Awards to two Oregon bricklayers, Joseph Von Ahlefeld (center) and George Krieng Sr. (right) at Portland. The Guild was established 30 years ago to honor outstanding craftsmen in the building industry.

Two Southern Operations Expand with New Products

Newest product of Jackson Ready-Mix Concrete, Jackson, Miss., is a line of lightweight units called Jax-Lite. The recently added operation is housed in a new $250,000 block plant. Production with a big GOcorp "King" block machine is at the rate of 1,000 to 1,200 8-in. equivalents per hour.

It was done "the other way 'round" in Huntsville, Ala., where the Johnston Concrete Products Company recently began turning out ready-mixed concrete in a fleet of five new mixer-trucks, T-800 Fords, which will be radio-equipped. This firm has been making block, septic tanks, grease traps, and cast stone.

A new 5-cu. yd. central ready-mixed concrete mixer has been installed by the Huntsville Building Material Company, Huntsville, Ala., to replace a 1-cu. yd. mixer. The larger mixer will enable the company to increase its volume 60 to 75 percent, according to R. P. Van Valkenburgh, head of the firm. The company also is installing a 788-bbl. bulk cement tank for dry cement.

The Preload Company, Inc., New York, N.Y., in line with a new program, now is granting exclusive territorial licenses in the United States for Preload construction methods in all fields of prestressed concrete—tanks, pressure pipe, precast structural members, cast-in-place and continuous structures, and pavements. Preload owns (or controls) more than 50 U.S. patents and patent applications.

ON THE JOB!

THE NEW TRAVEL BATCHER

The TRAVEL BATCHER can travel behind a truck with complete safety without Hi-way violation. On arriving at a destination, average set-up time is ten minutes.

Batch mixture is maintained uniformly with accurate scales mounted on the machine. The capacity of the TRAVEL BATCHER is 60 yards an hour delivered into mixer trucks.

By bringing the batch plant closer to the job, it reduces the number of truck mixers needed by as much as 83%.

Maintenance bills, long a headache of every ready-mix concrete operator, are reduced to a minimum.

The TRAVEL BATCHER offers the performance of a stationary batch plant, plus the convenience of mobility.

NORTH . . . EAST SOUTH . . . WEST

Satisfied customers everywhere make similar statements

JOHN L. SAVAGE

Carson City, Nevada, says:

"I have used several types of batchers . . . I've even made my own . . . but my new 'On the Job TRAVEL BATCHER' can accurately outproduce any other portable batch plant . . . because of its mobility I am getting jobs that I had to give up before . . . I plan on getting another TRAVEL BATCHER in the spring . . ."

JOHN L. SAVAGE

The hopper, with a capacity of 8 yards can be recharged with either a dump truck or a front-end loader.

TRAVEL BATCHER

For additional information write, wire or phone:

SOUTHEAST READY-MIX - 6450 HOLLADAY BOULEVARD - SALT LAKE CITY, UTAH

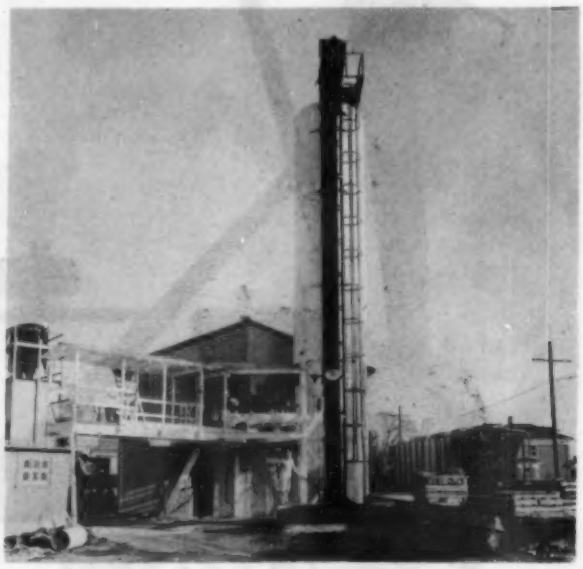
New Portland Putty Plant Mechanized to High Degree

A UNIQUE yet simple lime mortar and putty plant has been put in operation by the Masons Supply Company in Portland, Oreg., for the production of their MASCO certified lime mortar and lime putty for mason contractors and the plastering industry. Employing, as it does, every conceivable labor saving device from the dumping of the bulk raw lime from covered gondolas into track hoppers, to the final mixing and loading of the finished product, it represents the last word in pushbutton control of what has generally been considered a rather complicated process.

The design of the plant proper was handled by James G. Pierson, a professional engineer of Portland; the plan incorporated the combined research and thinking of D. V. Jennings, H. A. Van Patten, and O. T. Coffelt of the Masons Supply Company. This research had been carried on over a period of about seven years, with each member of the firm taking advantage of every opportunity, in the course of his travels, to investigate various plants and processes. These investigations included most of the outstanding mortar plants in the United States.

Basically, the operation is built around the premise that lime putty, to serve its proper purpose in either the masonry trade or the plastering industry, should be thoroughly aged and should contain a high proportion of lime solids. In addition to controlled slaking, this requires ample storage capacity for the proper aging of the lime putty. Such storage is provided by three wooden bins with sufficient capacity to insure a plentiful supply of aged putty at all times. It was felt by the producers that lime putty of the quality desired for their certified products could be obtained only by using wood for the construction of the aging tanks.

The slaking of raw lime has been simplified and streamlined, but this operation is the one point where it is impossible to substitute machines for men. The operation is accomplished by means of a continuous slaker, rather than the conventional batch type. The lime is fed into a continuous, accurately controlled stream of water at the intake of the slaker—continuously agitated by a mechanical device—and it is pumped from the discharge end to the aging vats by a self-priming, positive-dis-



Right: A plant view at the Masons Supply Company's facilities in Portland, Oreg., looking toward the sand storage tank. Sand is dumped at the base of the tank, to be carried to the top by the bucket elevator. The sand feed (on the platform) conveys sand from the storage tank to the continuous mixer. At the right is a bulk lime car.

The continuous slaker, the agitator, and the pump (right) with the enclosed bucket elevator (left) to the slaker hopper.

Wooden lime putty storage-and-aging tanks, with pump layout in the right foreground.

Don't buy any other truck mixer till you've seen

Worthington MIXERAMA!

"On-Your-Job" demonstration shows why Worthington's HI-UP Truck Mixer does a better job

We believe the best way to prove to you that no other truck mixer can match a Worthington Hi-Up is to let you watch one at work.

We call this down-to-earth demonstration Worthington MIXERAMA. You'll call it the real test of truck mixer performance. Worthington distributors across the country want you to be their guest at one of these fascinating shows.

What will you see?

- You'll see exactly how Worthington Hi-Up Truck Mixers are designed for maximum payload.
- You'll see how fast it discharges . . . even with low-slump concrete.
- You'll see a really *rugged* transmission — *specifically designed* for a truck mixer. Single-lever operation.

Be our guest — or we'll be yours

You can watch Worthington MIXERAMA in one of two ways:

1. You can tell your Worthington distributor you want to see a Hi-Up in action on your own stamping grounds — loading at your plant, delivering concrete to your customers. And make sure you pick a day when you've got a *tough* pouring job to do!
2. You may attend a MIXERAMA in your area. The distributor will tell you where and when.

Call your distributor now

Make arrangements today to see Worthington MIXERAMA — either working from your batching plant or from a Ready-Mix plant in your area. You'll be glad you did — almost as glad as you'll be when you can call one of these hardworking truck mixers your own. Worthington Corporation, Construction Equipment Division, Section R.5.1, Plainfield, N.J. R.5.1

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If It's a Concrete Job, It's a HI-UP *Job*

Rock Drills • Wagon Drills • Pavers • Concrete Mixers • Portable Pumps • Portable Compressors

placement pump. Close supervision is exercised through the entire slaking operation to see that the proper temperature range is at all times maintained to provide putty of the highest quality.

Because research has proven that the lime solids in one cubic foot of lime putty will show a considerable variation between the period of initial slaking and the time it is properly ready for use, the putty in the storage vats is checked prior to its use to determine the percentage of lime solids per cubic foot, thus enabling the company to certify to the architects and builders that when the specifications call for a fixed percentage of lime solids, they are receiving exactly that, and not water.

Intensive study has been given to the problem of the sand required to produce lime mortar of the greatest density and workability, with the minimum of segregation. The sand in MASCO certified mortar is prepared to the Masons Supply Company's own specifications. That this problem has been solved is evidenced by the fact that in deliveries up to 30 miles, no segregation or water gain is discernible. It is hauled to the plant by trucks, dumped, and then elevated by power to a large steel storage tank. From this tank it is conveyed by means of a screw with a fixed uniform capacity to the mixer.

A continuous type of mixer is used, in which the sand is fed to the intake in a constant volume. The lime putty is injected at this point through a unique pump with a pushing action which provides a uniform discharge without pulsation, thus insuring a metered, uniform flow. The speed of this flow is controlled to an extremely fine tolerance by means of a variable-speed control on the pump motor. Since this control is at the fingertips of the plant operator, he can adjust the quantity of putty instantly to meet any given requirement. An interesting feature of this type of control is that the question of proper measurement is no longer an "eye-ball" judgment of the plant operator but an accurate built-in scientific measurement which is an integral part of the entire operation.

The flow of materials and the mixing operation are so accurately calibrated that time is actually substituted for volume as the standard of measurement. At the expiration of the time necessary to insure the accurate delivery of the required quantity, the warning signal sounds, and pressing a button brings the combined mixing and loading operation to an end.

Where lime putty only is desired in bulk for the plastering and masonry trade, it is supplied through the same metering device, direct from the aging bins.

Only the highest quality of high-calcium lime is used in Masons Supply Company's operation. This policy was adopted on an investigation into the behavior of certain types of lime by the National Bureau of Standards and on the definite recommendations of this group that only those limes be used which do not exceed 1.0 percent increase in length when tested for expansion according to A.S.T.M. Standard Methods.

more than a lintel machine

Be the first in your market to use the amazing PreCaster which created such a sensation at the NCMA Convention at Cleveland. Enjoy the extra profits in 1955 from quantity production prices on concrete units that will strip through a straight box . . . hard-to-make slabs, highway guard rail posts, fence posts, joists, and the like. *Relatively low investment! One-man operation!* Write for data sheet and price list to *PreCaster Inc., 5217 Beech Street, Cincinnati 17.*

Lith-I-Bar Co. Announces Promotions, Appointments

The Lith-I-Bar Company, Holland, Mich., recently announced a promotion and three appointments. Herbert E. Glassford has been promoted to the position of sales assistant to Watler S. Giddings, the company's northeastern representative. Mr. Glassford has been field service engineer for the company in the same area for the last four years. He came to the company from the Sullivan Concrete Products Company, Ferndale, N. Y., where he was superintendent of production and maintenance for many years.

Lloyd H. Nivison has been appointed field serviceman. In his new position, Mr. Nivison will serve the Midwest and southeastern Canada.

Paul Schwendeman was named sales assistant to Ed Stielstra, the firm's West Coast sales representative. Mr. Schwendeman had previously been a service engineer, with headquarters in the St. Louis, Mo., area. Prior to joining the firm, he was employed by the Fleming Manufacturing Company.

Antonio Bersani was appointed to the position of field service engineer. Mr. Bersani came to the firm after being associated with the Quincy Cement Block Co. of Quincy, Mass., in the capacity of general manager of production and maintenance.

Donald Martin, manager of the Graystone Concrete Company's Chehalis, Wash., ready-mix plant, has been appointed general sales manager of all divisions of both Graystone of Centralia and Chehalis except the silo division. James Short, previously accountant for Graystone of Centralia, has been appointed to the sales staff of the silo division. B. Housden is assuming Mr. Short's duties at Centralia.

Send for this IMPORTANT BOOK

Possibly half the masonry-work currently being done in the U. S. utilizes concrete blocks.

Despite this wide usage, very little information has been issued on the type of *workmanship* required for good concrete-block construction.

The booklet shown above contains a full description of good block workmanship. It is completely illustrated. It is endorsed by leading officials of the American Institute of Architects, Mason Contractors Association of America, National Concrete Masonry Association, and the Bricklayers, Masons and Plasterers International Union of America. It should be in the hands of every architect, contractor and bricklayer. *Use the coupon today for getting your free copy.*

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NEW Stearns Direct-Drive Mixers eliminate clutch, pulley wheel, V-belt drive, counter shaft and counter shaft bearings, drive gear and pinion . . . reduces maintenance.

NEW Stearns Direct-Drive Mixers feature the gear-head in a sealed oil bath . . . for longer efficient operation.

Plus these standard Stearns features:

- Anti-friction bearings on blade shaft.
- Ni-hard sectional type drum liners.
- Water distributing manifold.
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- Air operated door.
- Drum grid cover.

You'll bring operating expense and maintenance costs . . . *way down*, while *raising* your block plant efficiency with the new, exclusive Stearns DIRECT-DRIVE mixer. Elimination of pulley, clutch and V-belt drive . . . reduces maintenance . . . lengthens mixer life . . . means fewer moving parts. This *new* Stearns mixer is offered in 42 or 50 cubic foot capacities, which also includes ruggedness, stamina and low maintenance features . . . a result of Stearns long experience in the building of quality block-making machinery.

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FOR LONGER SERVICE • GREATER PROFITS

Complete Concrete Products Plant Equipment — Standard of the Industry

Autoclave Building Products Association Meets in Buffalo

Buffalo hosts to the convention of the Autoclave Building Products Association meeting, Fred W. Reinhold and his son Grant, both of Anchor Concrete Products, Inc., Buffalo, N.Y.

Neil L. Hanson, Zenith Concrete Products Co., Duluth, Minn., told of his new autoclave installation.

Officers of the A.B.P.A. for 1955 (left to right): Leo J. Ryan, Ryan Builders Supplies, Ltd., Windsor, Canada, vice-president; Dale Cobb, Jackson Ready-Mix Concrete Co., Jackson, Miss., president; Henry DeGeus III, Saginaw Brick Co., Saginaw, Mich., treasurer.

THE 49th annual convention of the Autoclave Building Products Association held at the Statler Hotel, Buffalo, N. Y., on March 14, 15, and 16, could well be termed a melting pot for diversified opinions. That agreement was reached on many points is highly complimentary to the positive thinking of the 85 producers, guests, and representatives of allied firms who attended the meeting.

It is felt that the subjects discussed by the experts have an important bearing on what promises to be a big factor in the future progress of the entire concrete masonry industry. A serious problem was attacked—that of cracks which appear in walls due to volume-change shrinkage unless they are reinforced against this weakness. The fact that autoclaving definitely contributes to lessening shrinkage was one of the conclusions reached at the meeting.

A highly educational part of the program on the first day was the tour of the Anchor Concrete Products, Inc., plant under the guidance of Frederick W. Reinhold, president. Mr. Reinhold later summarized the high points of his operation. He stated that the plant featured diversification, 80 percent of the 15,000-unit daily output being autoclaved; that precast, pre-stressed Flexicore floor and roof slabs are being turned out; and that cellular concrete products will soon be produced. His future plans call for additional compartmented bins, a horizontal slurry mixer, automation of handling equipment, and inter-grinding of portland cement, fly ash, lime and silica flour binders which are now being used.

Featured on the opening day was the forum panel discussion of particular phases of autoclave plant design and construction. The six members of this panel included Ray Carlson, engineer, St. John, Platt and Carlson, Binghamton and Buffalo, N. Y.; Paul Hickman, director, Richmond Engineering Co., Richmond, Va.; Neil L. Hanson, Zenith Concrete Products Co., Duluth, Minn.; Carl A. Menzel, Portland Cement Association, Chicago, Ill.; John K. Selden, autoclave products consultant, Toledo, Ohio; and M. Winter Ferguson, Pre-Shrunk Masonry Sales, Roanoke, Va.

Mr. Hickman described safe design of the autoclave, corrosion conditions, choice of materials and sizes, basic economy, quality welding of the autoclave cylinder, interior arrangement, and types of closure doors. He emphasized the necessity of the installation meeting all pertinent requirements of safety codes, inspection, and construction minimums, adding that the A.S.T.M. code prescribes the material, the hardness and strength of the steel,

and other items in its specifications. Selection of the cylinder should be on the basis of providing curing volume per concrete unit, rather than volume only. Because of the high working pressures, welding must be the best; additional shell thickness must be provided against possible future weakening from corrosion or rusting; and doors must be capable of safe and quick operation. Mr. Hickman discussed various positions of the steam header, provisions for cleaning, and choice of rail or lift truck loading.

Mr. Carlson presented data on steam requirements, emphasizing the necessity of providing excess capacity to meet the various steam demands of the plant, and the need for co-ordinating these demands to get economical time of use. He stated that smaller installations may use a high-fire-box, fire-tube type of boiler, or one of the several small packaged boiler units, but that larger autoclaving operations usually require a water-tube type of boiler. All fittings, pipelines, and other increments carrying high pressures must be extra heavy. Stainless steel is preferable for valves, blow-down lines and condensate return system. Steam pressure or vacuum recorders, he said, are of prime importance for judging results in varying operation practices.

Mr. Ferguson, who has used high-pressure-steam curing in concrete blocks manufacture since 1939, gave primary importance to the chemistry of autoclaving, declaring that the basic reason for such curing is to hold the water in intimate contact with the complex crystalling forms produced by the elevated temperatures and pressures. He favors two-stage curing, to enable heat to leave the concrete unit before the high pressure hits it. He described some procedures he has followed and results he has obtained in his experimental work, which indicate certain conclusions, among them the importance of proper aggregate grading.

Neil Hanson, in an earlier talk that morning, told of the new autoclave installation at his company's plant, which initiated production of autoclaved units in July, 1953. With no prior equipment problem to be integrated into their plans, the owners accumulated all available data, and ran a series of tests in a 24-in. diameter by 6-ft. long model autoclave cylinder before making the full-scale installation. The laboratory data resulting from the model was later converted, with some changes, to full-scale operation of their 8-ft. 6-in. diameter by 128-ft. long autoclaves. The company also produces precast, prestressed floor-roof slab units and concrete pipe. In a frank recital of operational facts Mr. Hanson described the details of all equipment and methods used.

Carl Menzel contributed many valuable observations in his original panel talk and in a later question period, relative to various aspects of high-pressure-steam curing of masonry units, precast and foamed concrete. A few of his opinions included the following: To attain the full possibilities of high-pressure steam curing, concrete block should be exposed for a full 8 hours to saturated steam at a gauge pressure of 120 p.s.i. and 350° F., or for a full 7 hours at a gauge pressure of 140-150 p.s.i. and 360-365° F. This period of constant pressure and temperature should be preceded by a 3-hour heating period during which the temperature and pressure rise gradually to maximum values and should be followed by a pressure release period. During the last period the pressure drops as rapidly as possible to atmospheric pressure in not more than 20 to 30 minutes to reduce the moisture content of the block. It is highly advisable to have an automatic pressure recorder for each cylinder to provide a definite pressure-time chart for each load of block cured.

Mr. Menzel pointed out that as block were being more widely used for exposed interior walls, it was becoming increasingly important to produce more stable units which are less likely to develop cracks. It is quite likely that future treatments may require the use of a vacuum cycle; and hence it seems advisable to provide external rings on all new cylinders, so they may be properly reinforced for vacuum operation. He feels that present-day cements are entirely adequate for use in high-pressure-steam curing, and that any silica additions should be determined by trial with the particular aggregate being used. He said that a new method for determining the moisture condition of concrete in terms of relative humidity had been developed and that this would enable a block manufacturer to determine when his block were dry enough for the average relative humidity to which they would be exposed in service.

Rudolph C. Valore Jr., materials engineer, National Bureau of Standards, Washington, D.C., showed a

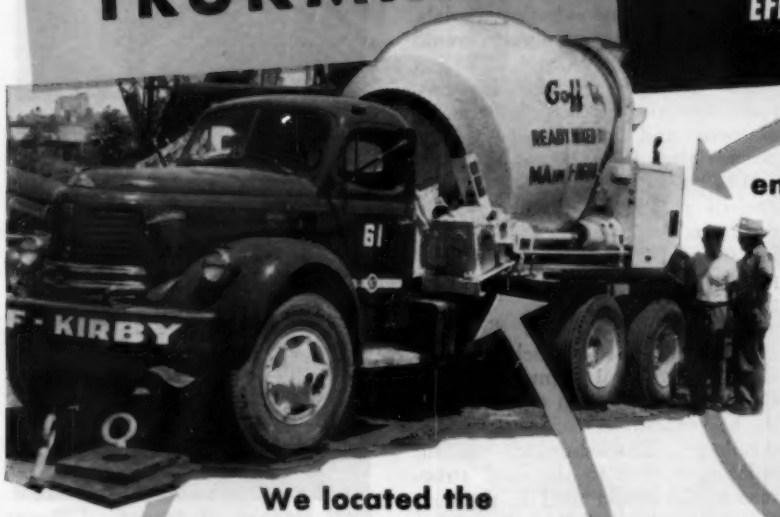
Forum panel members (left to right): M. W. Ferguson, Pre-Shrunk Masonry Sales, Roanoke, Va.; John K. Selden, Toledo, Ohio; Paul Hickman, Richmond Engineering Co., Richmond, Va.; Neil L. Hanson, Zenith Concrete Products Co., Duluth, Minn.; Ray Carlson, St. John, Platt and Carlson, Buffalo, N.Y.; Carl A. Menzel, P.C.A., Chicago, Ill.

Rudolph C. Valore Jr., National Bureau of Standards, Washington, D.C., who told of applications of autoclaving cellular concrete and showed slides illustrating them.

LOOK WHAT WE DID TO THE *Hi-Boy* TRUKMIXER

So you can . . .

- ★ HAUL MORE LEGAL PAY LOAD
- ★ ON SHORTER WHEEL BASE TRUCKS
- ★ WITH GREATER ALL-AROUND EFFICIENCY AND LESS MAINTENANCE



We moved the engine to the left rear

to keep it from taking up space between cab and mixer and to assure easier access for maintenance and periodic inspection. Inexpensive, easily cleaned air filter protects radiator. Drum is slightly off-set to the right to equalize weight of left-side mounting engine and transmission, assuring balanced stability and equalized tire loading.

We located the transmission at the side

of the combined pedestal and flush water tank to reduce cab-to-rear-axle dimensions 20 inches, so you can utilize more of the legal weight allowance on the front axle. Transmission is easily accessible even with close clearance between mixer and cab. Combining the flush water tank and pedestal reduces weight about 1000 lbs., and substantially lowers the center of gravity of the mixer.

We made these other design improvement

- *Large diameter short drum* mixes even zero slump concrete fast and thoroughly. Concentrates batch at front end, thus moving center of gravity forward to reduce cab-to-rear-axle requirements and assure better weight distribution.
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number of interesting slides featuring applications of autoclaved cellular products becoming increasingly more popular in Europe. He described the results of the Bureau's investigations of several typical processes. Included were descriptions of Ytong and Siporex, using 1:2 mixes of portland cement and silica, with varying amounts of lime, burned oil shale, and aluminum powder additions; neat portland cement or brick dust with air foam-whipped into it with aluminum powder inclusions; and foam-whipping of a 1:1½ mixture by weight of fly ash. All these produced cellular concrete within weight ranges of from 35 to 40 lb. per cu. ft. which had minimum strengths of 800 p.s.i.

Mr. Valore also described the products of Mearlcrete Manufacturing Co., and National Foam System, Inc., both of which utilize various vinsol resins and soap glues with rapid mixing to avoid planes of foam. He reviewed the European experiences of creating foamed concrete and predicted the extended use of such mixtures in this country, if due consideration is given to the limitations and proper applications of these materials.

Pursuing essentially the same subject, I. G. Ortengren, Alberta Ytong Manufacturing Co., Ltd., Calgary, Canada, told of present Canadian developments in the production of this cellular concrete. The name "Ytong" is derived from the name of the town of Yxhult, Sweden (where it originated) and the last syllable of the French word "beton" (concrete). In telling of the rapid adoption of cellular concrete in Sweden, Mr. Ortengren said that in 1946 about 87 percent of the residences built there utilized wood construction, whereas now such construction is only 10 percent of the total. He estimated present production of this type of concrete in Sweden to exceed 4,500 cu. yd. daily. He described his company's plant and its processing of unburned raw shale and lime as basic materials, and estimated that production would soon be 400 tons daily.

Mr. Ortengren said that his company uses autoclaves 7 ft. 4 in. in diameter and 76 ft. long. Curing periods vary from 18 to 22 hours, at 142 p.s.i. (360 deg. F.) pressures. Periods of 2½ hours are used in raising and in lowering this pressure. He stated that volume change and moisture absorption of Ytong are practically negligible.

In a highly technical discourse, Dr. George L. Kalousek, Owens-Illinois Technical Center, Toledo, Ohio, told of research conducted on the basic nature of concrete masonry shrinkage. This shrinkage in his opinion, is due to the shell structure of the binder used in the mixtures. He exhibited slides illustrating the forces competing in the normal shrinkage of any material—for example, water tending to leave and capillarity holding it back. He described shrinkage tests made on masonry units containing sand and gravel, expanded shale, cinders, and slag aggregates. Results varied in these tests, according to the degree of extensibility of the aggregate particle, which induced varying tensile strengths and moduli of elasticity in the specimen units. Units cured with high-pressure steam, when compared with identical units cured only in high temperatures, showed only 50 percent of the shrinkage of the latter.

H. T. Williams, Standard Slag Co., Youngstown, Ohio, and I. G. Ortengren, Alberta Ytong Mfg. Co., Calgary, Canada, discussing cellular products.

Bengt Lundgren, of International Siporex AB, Stockholm, Sweden, lightweight concrete manufacturers, showed films on the recent developments of that material.

Dr. W. C. Hansen, Research Laboratories, Universal Atlas Cement Co., Gary, Ind., gave a report on the activities of A.C.I. Committee 716.

Left: Three lime men who are interested in the prospects afforded by the autoclaving of concrete units (left to right): John M. Dalglish, president, Dallock Corp., New York, N.Y.; E. L. Hix, Electro Metallurgical Co., Niagara Falls, N.Y.; and William M. Pollock, Dallock Corp.

Right: John K. Selden, autoclave products consultant, described the autoclave plant of the future.

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Lift truck unloading blocks from 10-ft. diameter by 90-ft. long autoclave, seen on the inspection tour at the Anchor Concrete Products, Inc., plant, Buffalo, N.Y.

L. E. Rivkind, Roselle Park, N.J., technical director of Mearlcrete foamed concrete, shows how his equipment works.

Dr. Kalousek feels that the ultimate point in the efficiency of portland cement has not yet been reached. However, he thinks that portland cement might one day be eliminated as a binder material for units going through high-pressure-steam curing, which he considers a versatile tool for checking on the differences in aggregates.

On Tuesday afternoon most of those present at the meeting took advantage of the opportunity to visit Niagara Falls, Ont., Canada. The trip, *via* bus, permitted an excellent view of the falls. It was followed by cocktails, dinner, and an evening's entertainment at the Sheraton-Brock Hotel.

A report on the activities of Committee 716 of the American Concrete Institute was presented on Wednesday by its chairman, Dr. W. C. Hansen, manager, Research Laboratories, Universal Atlas Cement Co., Gary, Ind. This committee handles the correlation of research done by several agencies on various phases of high-pressure-steam curing of concrete masonry units. As stated by Dr. Hansen, its purposes include the promotion of concrete masonry and the dissemination of helpful information regarding its efficient production and use.

Dr. Hansen stated that specifications are now being worked out by this committee which will include the latest findings on the subject. This material is the result of research studies made by such agencies as the National Bureau of Standards, the Portland Cement Association, the National Concrete Masonry Association, and others. It is expected that in the course of these studies a quicker, simpler, and more accurate method will be found to replace those now being used for ascertaining the shrinkage in concrete masonry units. A progress report will be made at the next meeting of the committee at the time of the A.S.T.M. annual meeting in Atlantic City, June 26 to July 1.

H. T. Williams, Standard Slag Co., Youngstown, Ohio, who represented the National Slag Association at this meeting, presented considerable data regarding the use of expanded slag as an aggregate for concrete masonry units. Most of the annual production of approximately 2,300,000 tons of this material is utilized by the producers of such units.

Mr. Williams showed a series of slides on the various machines and equipment used in the production of expanded blast-furnace slag made by both the machine and pit processes. He outlined the operation followed in each case and described other processes used in such production by foreign producers. All expanded slag in this country, he said, meets the requirements of A.S.T.M. applicable specifications. The slag association will assist any interested producer to obtain information on expanded slag. Such producers may thus learn the results of investigations now under way on the possible causes and the elimination of corrosion or rusting of autoclaves, racks, and other metallic elements used in high-pressure-steam curing installations.

In discussion following the Williams paper a suggestion was made by Leo J. Ryan, vice-president of the A.B.P.A., which might prove helpful, as it did to his company. He said that one pint of engine oil per day injected into the main steam line through a sight-feed lubricator at the approximate rate of 6 drops per minute, had eliminated all corrosion in their autoclaving equipment.

In the final paper of the meeting John K. Selden, autoclave products consultant, Toledo, Ohio, described some features of the ultra-efficient, fully automatic "Turn-Key Autoclaving Plant" of the future. While such plants admittedly do not exist at this time in this country, they are definitely in the planning stage, according to Mr. Selden. Probably the closest approach to one would be the high automation found in certain plants producing aerated or cellular concrete in Sweden. The aggregate materials used in autoclaving, he said, should include a high percentage of fines, preferably furnished in three gradations. Especially advantageous, he stated, are the particles passing the 28-, 50-, or even the 100-mesh screens.

Mr. Selden said that the cementitious binders in autoclaved products include portland cement, lime (quick, hydraulic, and dolomitic types), fly ash, silica, and pulverized raw or calcined shales. The finer these are, the better will be the results. Lime contributes plasticity and whiteness, both worthy attributes. Fly ash is available everywhere and is cheaper to use than silica, which is the premium product in Mr. Selden's opinion. Fly ash has the extra advantages of light color, constancy, and non-interference with air-entraining agents which may be incorporated in the mix. Shales must be fully pulverized.

All or any one of these binders can be interground to advantage with consequent benefit at negligible

(Continued on page 195)

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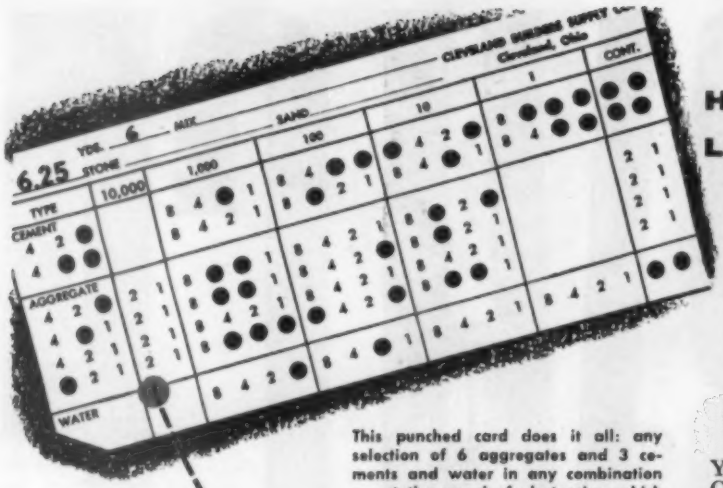

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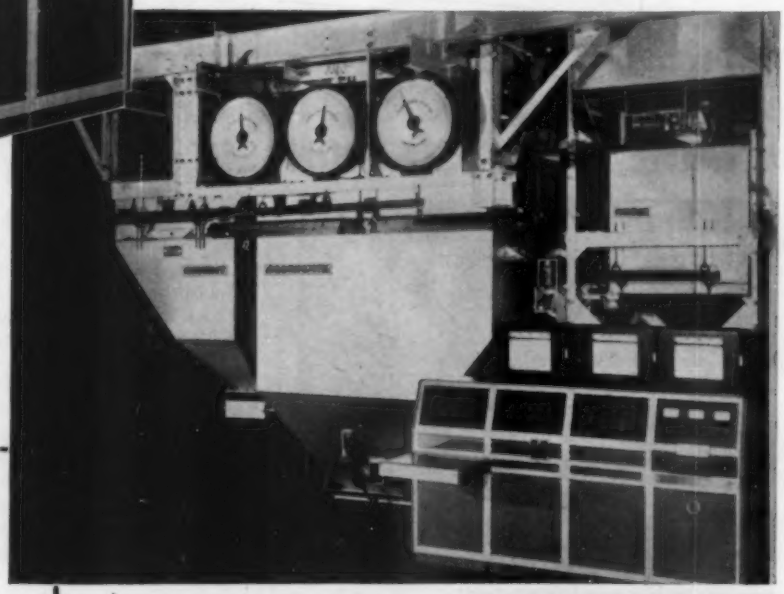

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Autoclave Meeting

(From page 192.)

cost. When so combined, they are usually mixed into a slurry before being placed in the mixer with the aggregates. In this connection, it was stated that high-speed mixing, now practiced to a great extent in Europe, gives greater plasticity and has other attributes to recommend such mixing.

The effect of temperature on aggregates and binders, particularly in winter, necessitates casting at higher temperatures, keeping the mixtures warm, and avoiding chilling subsequent to use. The most efficient use of autoclaves requires getting more blocks into a given cylinder by contouring racks, using longer cars, or otherwise arranging pallets. In any case efforts should be made to reduce the volume of equipment metal which must be heated and cooled in each cycle, while handling the greatest volume of blocks as payload per cu. ft. of autoclave. This ratio has now been brought down in modern autoclave installations to around 1.35 cu. ft. of autoclave volume per 8-in. equivalent unit. Mr. Selden feels that this can be further reduced.

Bengt Lundgren, manager, foreign department, Siporex International Company, Stockholm, Sweden, flew up to the meeting from Mexico City, to show two instructional films and tell of the most recent developments of that material.

In a business session of members, the following officers were re-elected for the ensuing year: Dale Cobb, sales manager, Masonry Products Division, Jackson Ready-Mix Concrete Co., Jackson, Miss., president; Leo J. Ryan, president, Ryan Builders Supplies, Ltd., Windsor, Ontario, Canada, vice-president; Henry DeGeus III, manager, Saginaw Brick Co., Saginaw, Mich., secretary-treasurer. M. Winter Ferguson, Pre-Shrunk Masonry Sales Co., Roanoke, Va., was named chairman of the concrete products committee. An announcement as to the new chairman of the sand-lime products committee, as well as the location of the next annual meeting of the association, will be forthcoming at a later date.

One of the newest industries in the Palmdale, Calif., area is the Palm-Lan Concrete and Supply Company, a semi-automatic operation owned by Galier Bros., Inc., of Cleveland, Ohio. Plant capacity is 100 cu. yd. of ready-mix per hour, and storage facilities accommodate 200 tons of materials. The plant was prefabricated by the Likens Manufacturing Company of Los Angeles.

National Cement Products Company, Toledo, Ohio, has been awarded a Zonatile manufacturing franchise by the Zonolite Company, Chicago, miner and processor of vermiculite. The Toledo firm, headed by C. B. Fellabaum, will distribute the precast insulating concrete roof decking in the Michigan and western Ohio area.

John Nagy Sr., 85, founder of the Columbia Concrete Products Co., Toledo, Ohio, died on December 26, 1954. He retired some years ago from the business, founded in 1891.

A fire causing damage estimated at $200,000 swept through the plant of the Economy Whole Block Company in Waukegan, Ill., on February 16. The one-story plant building was burned out, and the hopper and some block-making machinery were destroyed.

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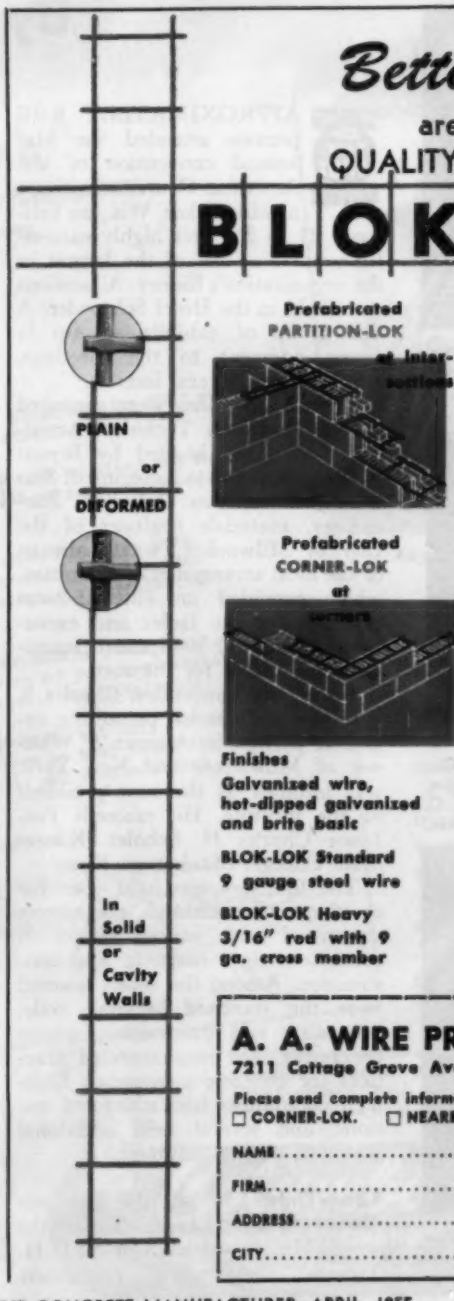

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Charles H. Scholer, retiring president of A.C.I., deep in a discussion with D. E. Parsons, director, National Bureau of Standards, Washington, D.C.

Carl D. Franks, former president, Portland Cement Association; Charles S. Whitney, Amman and Whitney, New York, N. Y.; Harry F. Thompson, St. Louis, Mo.

Willard L. Schunk, Kolinski Concrete Co., Milwaukee, Wis.; Bernard Vander Heyden, Doxblock System, St. Paul, Minn.; and M. C. Kolinski, Kolinski Concrete Co., Milwaukee.

Professor J. W. Kelly, University of California, Berkeley, Calif., and Berry Brevik, P.C.A., Chicago, recall other convention meetings.

A.C.I. Meeting and Exposition At Milwaukee Attended By 800 Members

another ON THE SPOT report

APPROXIMATELY 800 persons attended the 51st annual convention of the American Concrete Institute at Milwaukee, Wis., on February 21 to 25. This highly successful event was one of the largest in the organization's history. All sessions were held in the Hotel Schroeder. A fine group of exhibits, set up in rooms adjacent to the meetings, added to the general interest.

Technical sessions were arranged by the Institute's Technical Activities Committee, headed by Bryant Mather, Waterways Experiment Station, Jackson, Miss. Robert A. Burmeister, materials engineer of the City of Milwaukee, was chairman of the local arrangements committee, which provided an entertainment program for the ladies and excursions to several equipment manufacturing plants for the men.

During the convention Charles S. Whitney, well known consulting engineer, partner in Amman & Whitney of Milwaukee and New York, was installed as the new president of the institute. He succeeds Professor Charles H. Scholer, Kansas State College, Manhattan, Kans.

The first day was held open for meetings of technical committees concerned with various phases of concrete design, research, and construction. Among the topics covered were the standard building code, precasting and prestressing, winter concreting, and recommended practices for concrete pavements. Eighteen committees had scheduled sessions, and several held additional meetings during the week.

Long-Time Concrete Study At the first general session of the convention F. H. Jackson, engineering consultant, Washington, D. C., and formerly principal engineer of tests, Bureau of Public Roads, reported on the correlation of the results of laboratory tests with field performance under natural freezing-and-thawing conditions. This was one phase of the long-time study of cement performance in concrete which has been under way for the last 12 years. In addition to special sections of highways in a number of states, the tests of specimens exposed to varied weather conditions include piles submerged in seawater off the Maine coast and a large number of thin-wall boxes in northern Illinois and in Georgia. Observations have disclosed an almost complete absence of scaling in specimens made with Type I and Type II cements when entrained air of reasonable percentages was present. No correlation has been noted between the chemical composition of a cement and the service behavior of concrete made with that cement. The study has indicated that damage from freezing and thawing depends upon the amount of water present in the concrete and the number of air voids.

Precasting In Europe A three-part report on European precast concrete was presented by Douglas McHenry, Thor Germundsson, and Eivind Hognestad (all of the Portland Cement Association at Chicago and Skokie, Ill.), who recently visited the major north European cities. Mr. McHenry stated that the extensive and growing use of precast structural members has apparently resulted from (1) strong concrete, (2) high tensile steel, (3) high stresses which are commonly used, and (4) excellent structural connections.

Dr. Hognestad showed views of a

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precasting factory in Holland at which 1,000 men are employed. He emphasized that the successful application of precast members depends on full co-operation between architect, designer, and factory, and that economical manufacture depends on the repeated use of each set of forms.

Mr. Germundsson's pictures showed large factory and building projects in England, France, and Holland, where the structural units were made at the building site. He stated that precasting of structural members has become an important factor in European construction.

Interesting and amusing experiences were described under the topic *Concrete Facts and Fiction* by Robert C. Johnson, Siesel Construction Company, Milwaukee. Mr. Johnson's connection with construction began in 1907, when concrete was hand-mixed with shovels by men working 10 hours a day 6 days a week, and inspection was limited to grabbing a fistfull of a batch and considering whether more water, stone, and sand could be added. He spoke of selecting men with the largest hands to shake cloth sacks of cement so that at least 5 lb. were left in each sack, which would be shaken again at the conclusion of mixing. He recited how his friend "Joe Doakes", a successful contractor, had reported a shortage of steel for an apartment building when the structural work on another building in the vicinity had just been completed, although no steel had been ordered for it. Mr. Johnson emphasized, however, that he did not propose to divulge any construction secrets of by-gone days.

1955 A.C.I. Award winners. Thomas B. Kennedy and Katharine Mather, chief of the Concrete Division and chief of the Petrography Section, Concrete Research Division, respectively, Waterways Experiment Station, Corps of Engineers, Vicksburg, Miss., were the choice for the Wason Medal for noteworthy research. Rudolph C. Valore Jr., materials engineer, Building Technology Division, National Bureau of Standards, Washington, D.C., received the A.C.I. Wason Medal for the most meritorious paper.

Lightweight Concrete An entire session of the convention was devoted to papers on lightweight aggregates and lightweight aggregate concrete. Professor George W. Washa, University of Wisconsin, chairman of the institute's committee in this field, presided and gave a general summary of the committee's work. He described the three types of lightweight concrete as mineral, popcorn (*i. e.* no fines), and cellular. The use of the mineral types—including expanded clay, shale, and slag—has increased greatly in the last decade.

More details on the characteristics and production of lightweight structural items were outlined by Professor Ralph W. Kluge, University of Florida. He defined such concrete as that weighing less than 115 lb. per cu. ft. and having compressive strength of over 1,000 p.s.i. In producing concrete with expanded mineral aggregates, it is customary to use a high percentage of fines (usually 50 to 55 percent of the total aggregate) and to include an air-entraining agent to increase workability and durability. Bond resistance usually exceeds the requirement of the A.C.I. code by a wide margin. The mechanical procedure of structural design with lightweight units follows the same line as that utilized for conventional heavy concrete. Professor Kluge stated that pre-soaking of expanded aggregates is the general practice; but in the discussion it was pointed out that pre-soaking makes difficult the maintenance of uniform consistency, and that many operators depend on longer mixing at slow speed to permit the needed absorption of water by the aggregate.

In discussing the production of lightweight masonry units Clifton C. Carlson, Portland Cement Assn., declared that block is by far the largest item. In 1954 there were produced in this country approximately 800,000,000 units. Standard blocks weigh from 22 to 30 lb., as compared to 40 lb. for gravel concrete.

Mr. Carlson stated that the optimum grading of aggregates is influenced by the type of molding machine, adding that the most widely used machines employ a combination of pressure and vibration. Most manufacturers are using steam curing; but there is a trend toward pressure curing or autoclaving, which reduces the drying shrinkage. Among the advantages of lightweight block, as compared to heavy block, are reduction in weight, better fire resistance, greater sound absorption, and higher thermal insulation.

Characteristics of types of concrete used for sound insulation and thermal insulation were discussed by R. C. Valore Jr., National Bureau of Standards, Washington, D. C. He pointed out that the finer the air voids in a material, the better the thermal insulation. In this respect the so-called cellular concrete is superior to concrete made with lightweight mineral aggregates. Cellular concrete is made by mixing a gas-producing material with cement paste; it is not generally used structurally as the compressive strength is low and the shrinkage high, even when autoclaved.

Movies of Projects In the ensuing discussion of lightweight concrete a member asked how to prevent shrinkage cracks in walls over 25 long. One producer suggested the use of reinforcement be-

The terminal building at the Lambert-St. Louis Municipal Airport is of triple-dome construction, 120- by 450-ft. in size, with concrete shells only 3½-in. thick. This structure was the subject of a convention paper.

tween alternate courses of blocks, another the incorporation of control joints in the design. It was implied that new information on the spacing of control joints would be published soon.

An evening session featured motion pictures on various phases of concrete construction. *New Breakwater Construction Techniques,* issued by Technical Enterprises, Inc., Chicago, showed the making and placing of "tetrapods" for breakwaters. *Prestressed Concrete Over Tampa Bay,* made for the Preload Construction Company, New York City, showed the production and installation of prestressed beams for the Lower Tampa Bridge in Florida. *Power for Niagara,* showing operations of B. Perini & Sons, Inc., Framingham, Mass., illustrated work on the new Niagara Falls tunnel being built for the Hydro-Electric Power Commission of Ontario. *Pumped Concrete,* a Chain Belt film, showed various projects which utilized pumping to transport and place concrete.

Paving Session An entire session was devoted to a discussion of pavements, including city streets, highways, and airport runways. R. A. Burmeister outlined the practices of the City of Milwaukee in specifying, inspecting, and testing concrete for street construction. The city has been specifying 6 sacks of air-entrained cement per cu. yd., with two sizes of coarse aggregate. During the years 1949 through 1953 the quantity of concrete placed was 428,000 cu. yd., mostly from commercial ready-mix plants. Wire mesh has been used in all slabs, with joints at 20 ft. spacing.

An especially important paper was presented by Thomas Cholnoky, Frederick Harris, Inc., New York City, on *Prestressed Concrete Pavements.* The principal advantages of prestressed slabs were stated as follows: (1) greater load-carrying capacity and (2) elimination of the great number of expansion and contraction joints needed in conventional concrete pavements. Mr. Cholnoky pointed out that prestressing would give greater strength and a higher degree of flexibility, which would insure the original continuity of the pavement after any excessive loading, provided that the ultimate strength of the prestressed section had not been exceeded. He emphasized that prestressing of pavements can be considered practical only if means are developed to adapt its use to present paving methods, and at a competitive cost level. He suggested that the extensive experience in linear and circular prestressing in the structural field should encourage the development of a practical application for the paving field.

The design of joints for paving and the use of dowels was discussed by E. A. Finney, Michigan State Highway Department, and the use of reinforcement for crack control was covered by B. F. Friberg, consulting engineer, St. Louis, Mo.

Unusual Construction Projects A concurrent session of the convention was devoted to descriptions of recent construction having unusual significance. The project of building a 2,000,000-gal. prestressed-concrete elevated water tank was a project reported by J. J. Closner, Preload Company, and T. Carlweitz, B. M. Heede Company, Inc., both of New York City. This tank is 98 ft. 6 in. in diameter; it has a wall height of 35 ft. and rests on a heavy reinforced concrete slab. The slab and tank are mounted on four circular concentric concrete walls. The dome, for which the concrete was pumped, is 4 in. thick. Slip forms were used on the 83-ft. substructure. The tank itself was prestressed both vertically and circumferentially. This is probably one of the largest elevated concrete tanks ever built.

A project which required a large quantity of "prepakt" concrete—*i.e.,* the space filled with coarse aggregate and the voids then filled with grout—was described by R. E. Davis Jr., Prepakt Company, Cleveland. The construction of an electric generating plant at Kemano, B.C., Canada, required building a 324-ft. high dam, driving a 25-ft. tunnel for 10 miles through the mountains, constructing an 11-ft. penstock 3,900 ft. long on a 48-degree slope, and building an underground powerhouse 700 ft. long, 83 ft. wide, and 140 ft. high. A total of 27,000 cu. yd. of prepacked concrete encasement was used in the penstocks, pit liners, and scroll cases.

The use of the lift-slab method of construction on a 530,000-sq. ft. office building for the Ford Motor Company at Dearborn, Mich., was described by B. H. Miller, Skyhook Lift Slab Corporation, Kansas City, Mo. He stated that this type of construction requires only 50 to 75 percent of the time for conventional construction, depending on the type of job. Important factors of economy are the elimination of form construction for each floor and the placing of most of the concrete at ground elevation, where the work is done more efficiently than at elevated heights. Flat slab spans up to 36 ft. have been handled; slabs can be raised to 3 stories without bracing the columns and to 10 stories with bracing.

Triple-Dome Airport Building W. C. E. Becker, consulting engineer, St. Louis, Mo., and Anton Tedesko, Roberts and Schaefer Company, New York City, were the co-authors of a paper describing the design and construction of an unusual thin dome project. This building is the new terminal at the Lambert-St. Louis Municipal Airport. The 3-story structure measures 120 by 450 ft.; it is roofed by three domes, each of which is 120 ft. square and comprises two intersecting cylinders which rise 32 ft. above the third floor level. The dome shells are 3½ in. thick. The horizontal thrust is taken by structural steel joining the four corners of each unit. Each shell required approximately 400 cu. yd. of concrete, placed in a continuous pour. The interior of the domes is clear, without any suspended lighting fixtures. The centering for the roof construction comprised 11 parts, each supported on rollers, which were moved from shell to shell. The structure presents an unusual appearance, both outside and inside.

Awards The traditional awards luncheon included several new features. Awards were presented by President Scholer on behalf of the board of direction to the following:

Henry C. Turner Medal (posthumously) to Roderick B. Young. Mrs. Young was present and acknowledged receipt of the medal.

Wason Medal for the most meritorious paper in the 1954 A.C.I. *Journal* to Rudolph C. Valore Jr., National Bureau of Standards, Washington, D. C.

Wason Medal for noteworthy research to Thomas B. Kennedy and Katherine Mather, both of the Waterways Experiment Station, Jackson, Miss.

Honorary Members The election of the following to honorary membership was announced: Frank H. Jackson, engineering consultant, Washington, D. C., formerly principal engineer of tests, U. S. Bureau of Public Roads; and Thomas E. Stanton, formerly materials and research engineer, California Division of Highways, Sacramento, Calif.

An innovation was the presentation of beautifully designed bronze plaques to the 11 past-presidents attending the meeting. The senior past-

president was Professor Raymond E. Davis, who served in 1942.

New Officers After the report of the tellers had been presented, the following were introduced as elected officers of the institute:

President — Charles S. Whitney, consulting engineer, Milwaukee and New York City; and vice-president (for 2 years)—Walter H. Price, Bureau of Reclamation, Denver.

Directors named (for 3 years) are as follows: H. C. Delzall, Chicago, Ill.; Thomas B. Kennedy, Jackson, Miss.; Walter J. McCoy, Coplay, Pa.; and Douglas McHenry, Chicago, Ill.

The retiring directors and officers were presented with certificates in recognition of their service. It was announced that Harry F. Thomson, retiring past-president, has served on the board of direction over a period of 16 years, the longest service in the history of the Institute.

Scholer's Address In his address as retiring president, Professor Scholer stated that as the American Concrete Institute enters its second 50-year period, its field of activity has continued at a high level. Its financial condition is excellent, and the membership, now approaching 7,000, is the largest in the organization's history. He pointed out that the institute's membership is not confined to engineers, but includes producers, manufacturers, researchers, and contractors—in fact, all interests connected with concrete. The institute is the clearing agency for new developments in the field of concrete. Mr. Scholer also emphasized that an important function is the continual repetition of the principles underlying good concrete construction.

Simplified Thin-shell Design On the afternoon following the awards luncheon concurrent sessions were held on design of concrete members and on construction equipment. The design topics included shear strength of beams, tension strength of lap splices, and strength of T-beams under combined shear and tension. In the final paper at this session Dr. M. G. Salvadori startled the audience by proposing drastic simplifications in the design of their shells, which he predicted would lead to a much higher demand for thin-shell structures. He declared that with simplified design formulae and greater experience we may see in the not distant future a shell of only 4-in. thickness spanning a width of 1,000 ft.

Advances in Equipment In the discussion of construction equipment Glenway Maxon, consulting engineer, Milwaukee, proposed that for mass concrete requiring large-size aggregates, the mixing efficiency would be improved by using two mixers. In the first all ingredients up to 1½-in. aggregate would be mixed and then discharged into one end of a double-end mixer of twice the size of the first. At the same time, the second (larger) mixer would be charged at the opposite end with the large-size aggregate.

As an improvement in constructing unformed, sloping areas of concrete (as in reservoir sides and canal linings), Lewis H. Tuthill, Bureau of Reclamation, described a slip-form strike-off unit which holds the concrete temporarily while it is being vibrated. This device facilitates placing well-consolidated and accurately-surfaced concrete on a slope too flat to form.

C. B. Van Alstine, Board of Water Commissioners, Denver, Colo., described a dial meter which furnishes a mixer-operator with information on the moisture in sand and gravel as batched. This device indicates the electrical resistance between two electrodes mounted in the batch hopper; the meter can be calibrated to read the percentage of free moisture in the material, which in turn permits the operator to adjust the amount of added water so as to maintain a fixed quantity of total water in successive batches, even though the moisture varies widely.

New specifications of the Corps of Engineers for weighing equipment as required on projects of various sizes were outlined by W. L. Burgess, office of the chief of engineers, Washington, D. C. These specifications were adopted after extensive tests had been conducted on various types of weighing equipment on the market. On projects of less than 5,000 cu. yd. the weighing may be manual, but on larger projects either semi-automatic or fully-automatic weighing will be required. Mr. Burgess stated that the new specifications are intended to remove the uncertainty which has previously occurred on some projects as to facilities which must be furnished by the contractor.

Welcome by Mayor At a cocktail party and dinner held in the Crystal Ballroom of the Schroeder Hotel, Dr. A. Allan Bates, Portland Cement Association and director of the institute, presided as toastmaster. After his remarks of welcome, Frank P. Zeidler, mayor of Milwaukee, stated that the problem of Civil Defense protection is a challenge to engineers, in that decisions based on shrewd estimates must be made in advance of actual danger, in order to minimize loss of life during an emergency. He proposed more fireproofing of city structures and a dispersion of industries.

A forceful address on *The Impact of the Seaway on the Midwest* was delivered by Harry C. Brokel, Milwaukee port director. He predicted that industry, agriculture, shipping, and the entire economy of the Great Lakes states and the Midwest would benefit greatly from the seaway project.

The convention closed with the traditional open meeting of the institute's Research Committee, under the chairmanship of Professor S. J. Chamberlain, Iowa State College. Progress reports were presented on research being conducted in ten public and private laboratories, ranging from tests on retarders to new apparatus for determining abrasive- and spark-resistance of industrial floors. Research projects on 51 subjects pertaining to concrete which are under way at 80 institutions were summarized in mimeographed lists prepared by Professor Washa.

Inspection Trips A large proportion of the men attending the convention took advantage of the inspection trips arranged by the local committee to several of the Milwaukee plants which manufacture heavy construction equipment. Among those visited were the facilities of the Allis-Chalmers Manufacturing Company, the Chain Belt Company, the A. O. Smith Company, and the T. L. Smith Co.

Exhibitors The Milwaukee convention committee also sponsored an interesting exhibit of equipment, materials, and services which was held in an area adjacent to the meeting rooms at the Schroeder Hotel. The exhibitors included the following: American Concrete Pressure Pipe Assn., Baldwin-Lima-Hamilton Corp., Butler Bin Co., Calcium Chloride Institute, Cen-Vi-Ro Manufacturing Co., Chain Belt Co., Chicago Fly Ash Co., Copperweld Steel Co., Gar-Bro Manufacturing Co., Hunt Process Co., Master Builders Co., Prestressing, Inc., Pumice, Inc., John A. Roebling's Sons Corp., Sika Chemical Corp., Sonoco Products Co., Superior Concrete Accessories, Inc., Symons Clamp and Manufacturing Co., Techkote Co., Inc., Water Seals, Inc., and Webrib Steel Corp.

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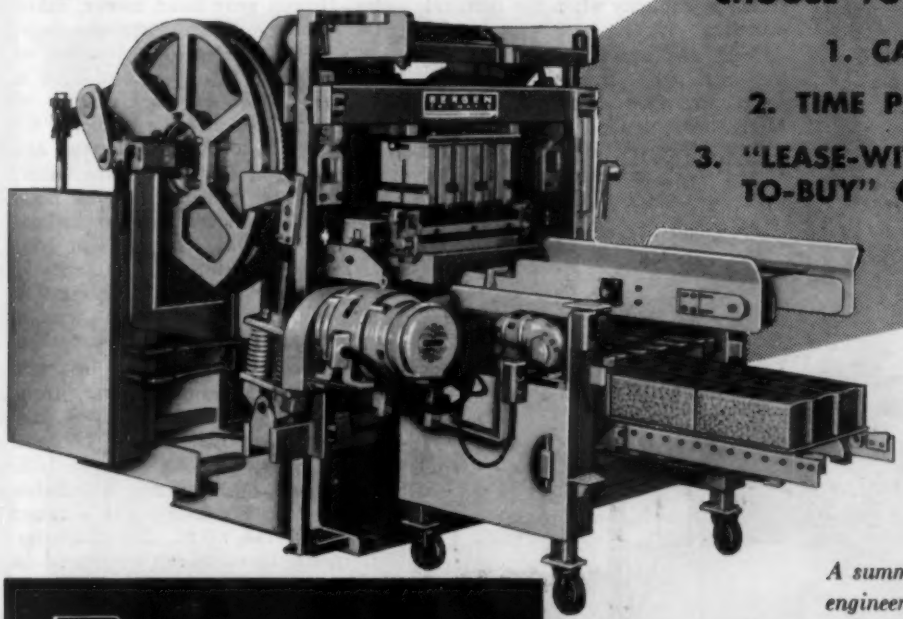

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New Michigan Ready Mix Plant Is Example of Automatic Control

another ON THE SPOT report

CONSOLIDATED Concrete-Mix Corporation recently put into operation at Trenton, Mich., a ready-mixed concrete producing plant of the most advanced design. Located on a 6-acre site on the outskirts of the concrete-conscious De-

By ROY L. PECK

troit area, it should contribute materially to the increasing demand for such concrete in the rapid build-up of industrial and residential construction that area is now undergoing. This growth has been phenomenal, despite the cement shortages resulting from large expansions in Detroit automotive facilities, road building and widening projects, and the initial demands for 650,000 bbl. of cement to build the Straits Bridge.

Ted Stalmack, president of Consolidated, has an impressive record of experience in concrete production which proved valuable in arriving at a plant layout requiring the minimum of labor and utilizing the latest devices in automatic control of materials. The overall initial cost of plant and hauling equipment exceeded a quarter of a million dollars and provision has been made in all components for an appreciable increase in capacity when the demand warrants.

Scene at the Consolidated plant, showing a 24-in. by 215-ft. 240 t.p.h. belt conveyor, powered by a 25-hp. gear head motor. The cement silo and elevator are at the right of the building.

Sand and gravel aggregates, delivered by truck from the American Aggregates Corp. pits at Brighton, Mich., are unloaded into two 39-cu. yd. Erie-Strayer two-compartment Model GT underground hoppers with top openings of 5 in. between rail grids (spanning each hopper). A 240-t.p.h. Pioneer 24-in. by 215-ft. belt conveyor, powered by a 250-hp. Howell gear head motor, takes the discharge from under the hoppers at an 18-degree inclination to the overhead aggregate bin. This is an Erie-Strayer Model CTC bin of four compartments, each holding 83 cu. yd., or a total of 460 tons of aggregates. A rotary spout distributor, with a cable control from the hopper at ground level, receives the belt discharge, which can be sent into any of the four bin compartments. A Pioneer Model GA vertical-gravity belt tightener keeps proper tension on the belt conveyor at all times.

The company's office building, four-compartment 460-ton-capacity aggregate bin and the two-compartment cement hopper.

Bulk cement is delivered by truck into a truck dump hopper, from which a 12-in. diameter screw conveys it to an Erie-Strayer 75-t.p.h. bucket elevator, powered by a U.S. 20 hp. motor, operating a variable speed reducer running with a range of 75 to 158 r.p.m. The discharge from this elevator can be placed in either of two cement storage silos, one of 660-bbl. capacity or into a two-compartment 725-bbl. silo. Two automatic two-speed feeders take the cement from either of the silos to the Erie-Strayer Model DWHA 60-cu. ft. cement batcher. Aerating jets are installed in both silos and in the batcher, interlocked with the opening gate to operate only when this

BESSER

★ This is the 118th of a series of ads featuring leaders in the Concrete Products Industry who are stepping up block production with Besser Vibrapac machines.

Joe Chalupa Jr. and Walter Milnar, officials of the Standard Building Material Company, South St. Paul, Minn.

Company yard office built with VIBRAPAC block.

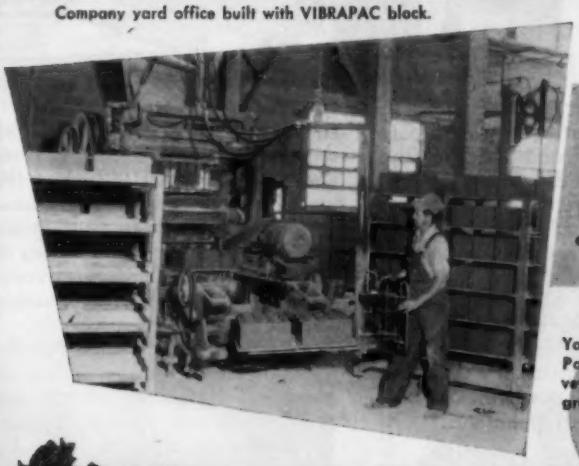
Old Time Block Maker Prefers VIBRAPAC for High Production

When Standard Building Material Co., South St. Paul, Minnesota, required a high production block machine, they naturally specified the Besser VIBRAPAC.

Block producers since 1916, the company learned from experience that only if a machine can be kept running day after day, week after week *without downtime,* can block costs be reduced to a minimum. The Besser VIBRAPAC meets that requirement. In the words of Joe Chalupa, Jr., general manager, *"We feel the Besser machine is the best obtainable."*

Now operating at full capacity, the Standard Building Material Company is known throughout the Twin City area for its high quality block. About 50% is used for home construction. In addition to producing block, the company operates its own gravel plant.

Ask a Besser Representative for Vibrapac literature.



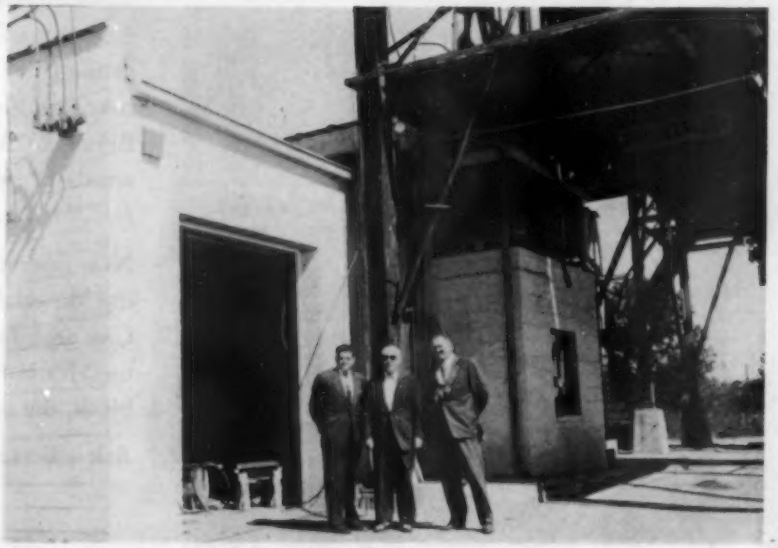
VIBRAPAC, Front Pallet Feed Model, installed in the Standard Building Material Company plant. This high production machine produces up to 10,000 high quality block (8" or equivalent), daily.

BESSER COMPANY
Box 131, Alpena, Michigan, U. S. A.
Complete Equipment for Concrete Block Plants

Yard scene at this South St. Paul plant. Note long conveyor belt for elevating aggregate to bins above mixer.

Interior of the glass-enclosed control room, showing automatic electronic weighing equipment, pushbutton scale, selectors, and recorders.

A view of truck loading driveway showing the control room. T. J. Stalmack (president), the writer, and Joe Stefani (plant superintendent) are in the foreground.



gate is closed, and with the air-operated discharge valve. A DeVilbis compressor furnishes the compressed air for the plant.

An 8-cu. yd. Erie aggregate batcher under the cement and aggregate bins has full automatic remote controls for the batching of all aggregates, cement, fly ash, and water. All gates are electric- or air-operated, of single clam, radial-type, with remote controls set in the operator's glass enclosure from which he can observe all operations. A Hardy dual batching scale electronically weighs all materials. This can be set to control four different aggregates, with a range of 0 to 30,000 lb., and two types of cement.

A 2,000-gal. water tank, with steam coils inside for heating the water, is connected with a 3,500-gal. water storage tank installed on the ground level. A 3-in. pump and line takes the water from the upper tank through a 3-in. Niagara meter at 32 p.s.i. to a point above the charging hoppers of the truck mixers. Both tanks are connected with the city water mains. To accommodate all sizes of truck mixers, a 13-ft. height is maintained under the aggregate batcher, and under the telescoping boot of the cement batcher.

Hauling equipment consists of ten truck mixers, mostly mounted on International R-190 chassis. Seven of the mixers are Worthington 5½-cu. yd. Models, two are Jaeger 5½-cu. yd., and one (mounted on an Available truck) is a 6½-cu. yd. Jaeger. An Allis-Chalmers Model HD5 crawler tractor, with a 1-cu. yd. front end bucket, is used for yard cleanup and miscellaneous work around the plant.

Matching the excellence of the equipment is the housing of the plant. A 50- by 34-ft. two-story office building was built of cinder concrete masonry units, with face brick on the front elevation. The first floor contains two offices, a garage and repair equipment, and a display space; on the second floor are the control room and the drivers' change and recreation rooms. The control room is glass-enclosed, permitting the operator to see all plant functions immediately outside and under the batchers. It also contains the Hardy automatic electronic pushbutton scale, weighing controls, and selectors and recorders, by means of which each operation is determined and activated. All plant current is 220-volt a.c.

In excavating for the truck dump hoppers, a quicksand deposit was encountered, underlying 11 ft. of clay soil. Considerable extra excavation and drainage was required to eliminate this material. The remainder of the plant site is on solid ground. All operating areas have been finished with rolled gravel driveways, later to be topped with bituminous asphalt or concrete.

Thaddeus J. Stalmack is president, and Joseph Stefani is partner and plant superintendent of the company, which will employ 15 persons in producing a peak output of around 325 cu. yd. of concrete daily with the present equipment.

Julius Masiello, president and a co-founder of the Goodstone Manufacturing Company, Rochester, N. Y., died on December 17, 1954. The firm manufactures pre-cast products.

William A. Bellisle, formerly a construction engineer in Georgia, has been appointed executive secretary of the North Carolina Concrete Masonry Association, according to an announcement released by T. F. Bradshaw, president of the organization. Mr. Bellisle was formerly engineer and job superintendent for the Ray M. Lee Company, Atlanta.

Ed F. Rice and Otis E. Nidiffer, two Tulsa builders, have purchased the Fred M. Stowell Concrete Company, Tulsa, Okla. The new company, called the Tulsa Ready-Mix Concrete Company, is headed by Mr. Rice as president; Mr. Nidiffer, secretary; and Bob Lschack, executive vice-president and plant manager.

Mid West R.M.C. Association Meeting Presents Aspects of Quality Concrete

On March 7 and 8 the 13th annual convention of the Mid West Ready Mixed Concrete Association was held at the Drake Hotel in Chicago. Speakers at the two-day conference covered prestressed concrete, air-entrainment and ready-mixed concrete in highway construction. Vincent P. Ahearn, executive secretary of the National Ready Mixed Concrete Association also presented his highly interesting *Report from Washington.*

After a welcome by President D. C. Hay, South Bend, Ind., Frederick E. Koebel, vice-president and chief engineer, Prestressing, Inc., San Antonio, Tex., presented factual data regarding the relationships of prestressed and ready-mixed concrete, including several price analyses of typical jobs.

Why Air-entrained Concrete? was the subject of a paper by John S. Hamilton, the E. W. Zimmerman Co., Chicago, in which he discussed the economics of its increasing use by ready-mix operators. He stated that 35 percent of all cement used in Illinois in 1954 was of this type. He pointed out how cost savings of from 4 to 9 cents per cu. yd. accrues to the operators in the saving of fine aggregates with air-entrained concrete, and offered several worthwhile suggestions as to merchandising this type of concrete to users.

Mr. Ahearn reviewed construction statistics on a national basis in expertly diagnosing the various implications to the ready-mixed concrete industry inherent in President Eisenhower's suggested 10-year highway program. He felt that considerable difficulty might be encountered in financing the 70 percent portion of the cost of this project which is to come from the separate states. Expansion of local construction, such as schools, residences, and the like, holds greater interest to the industry, he feels, than expected returns from their participation in the national highway program.

He urged that ready-mix producers endeavor to obtain escalator clauses in their contracts whenever possible in the years ahead, to balance the inevitable extra costs of production. Tax increases, higher labor costs, the possibility of strikes following demands for annual wage schemes, minimum wage increases, and possible political uncertainties are some of the factors which Mr. Ahearn believes must be taken into consideration in looking into the business future.

On the second day the motion picture *Quality Ready Mixed Concrete,* produced by N.R.M.C.A. in co-operation with the Portland Cement Association, was shown. The verbal account accompanying the film focused attention on features of production which are of great value to the ready-mix producer.

L. L. Shidler, President of the Shidler Construction Materials Company, Kankakee, Ill., was named president of the association.

The viewpoint of the highway engineer toward ready-mixed concrete was given in a talk by J. D. Lindsey, engineer of materials, Illinois Division of Highways, Springfield, Ill. Mr. Lindsey presented figures on the large percentage of ready-mixed concrete used in state highway construction, most of this in appurtenant structures. He also cited results of strength determinations of ready-mix, compared with job-mixed concrete, for this construction. From these comparisons, he judged that the industry must have serious problems which should be solved, to correct the impression that most highway engineers have that ready-mixed concrete cannot be furnished in the low slumps demanded by most highway construction. He feels that the industry possesses the necessary knowledge to "police" itself in attaining quality concrete, and that control of moisture, mixing in transit, and driver technical understanding are important factors in obtaining this necessary quality.

Before the fellowship luncheon, the following officers were elected for 1955: president, L. L. Shidler, Kankakee, Ill.; vice-president, R. J. Jennings, Muncie, Ind.; treasurer, E. G. Hurst, Hillsboro, Ill.; and secretary, R. E. Hutchins, Terre Haute, Ind. New directors chosen (for three-year terms) included Gene W. Gunther, Galesburg, Ill., Fred Schumaker, Indianapolis, Ind., and Thomas A. McGurk, Crawfordsville, Ind.

R. J. Jennings, Muncie, Ind., the newly-elected vice-president of the association.

E. G. Hurst, president of Hurst-Rosche, Inc., Hillsboro, Ill., Mid West R.M.C.A. treasurer.

Block and Ready-Mix Plant At Port of Palm Beach, Fla. Taken Over by Rinker

By KENNETH A. GUTSCHICK

ABOUT a year ago the Rinker Materials Corp., West Palm Beach, Fla., headed by M. E. ("Doc") Rinker, a prominent figure in the concrete masonry field, expanded its operation by taking over Portland Industries, Inc., a combined block-and-ready-mix plant located at nearby Port of Palm Beach. This plant, built in 1953 at the cost of about $500,000, was one of the largest and most modern concrete products plants in Florida. It is now operated as an affiliate under the name of the Rinker Riviera Co.

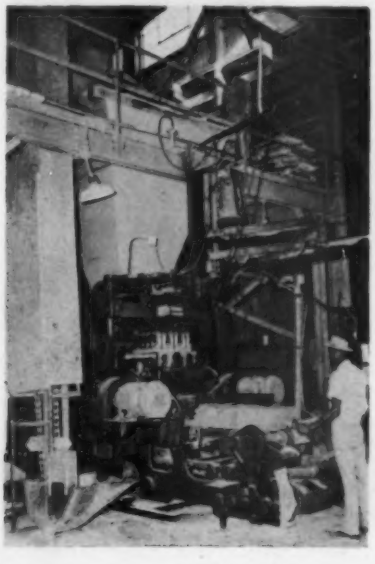
Shortly after the purchase Mr. Rinker revised some of the original layout in order to make it conform to the company's standard plant setup. The major change in the block operation was the installation in November of a new high-capacity block machine, which is similar in manufacture to the machines used at the other Rinker block plants in West Palm Beach and Fort Pierce. As a result of the standardization, the company has been able to reduce its inventory of spare parts and mold boxes and to effect a better integration of the three block plants. Further, through the use of similar machines, masonry units identical in all respects are produced; consequently, any construction job may be served by more than one of the plants without fear of supplying different-type units.

The major change in the ready-mix operation involved switching from a central mixing setup to transit mixing. According to Rosser D. Elkins, manager of Rinker Riviera, this change was effected primarily to lower operating costs and thereby enable the firm to compete in the highly competitive ready-mix market of southeastern Florida, which is almost exclusively served by transit mixing plants. Additional changes included the installation of two-way radio and the purchase of brand new truck mixers. Further improvements in the aggregate handling and batching facilities are now under way. As a result of the renovation, the plant is expected to operate at peak efficiency.

The Riviera plant is strategically located on a 4-acre plot between U.S. Highway 1 and a slip on Lake Worth. The latter permits crushed stone aggregates to be brought in by barge, the material originating from a Maule Industries quarry in the Miami area. Rail facilities are also available, *via* the Florida East Coast Railway, which are used for importing most of the bulk cement and a small portion of the aggregates. Yard space is extensive, per-

Aerial view of the Rinker Riviera Co. dual block-ready mix operation located at the Port of Palm Beach, Fla. The main aggregates conveyor, which will be extended to the dock site, leads to the block plant bin and to a cross-conveyor charging the ready mix bin.

The vibrating block machine produces 950 units per hour; the bucket elevator (left) returns green block rejects to the mixer.



mitting large stockpiles of both aggregates and block.

For aggregate handling, a Marion ¾-cu. yd. clamshell crane is used, discharging directly to trucks or to stockpiles. The material is then dumped into a 10- by 10-ft. hopper and transferred to the dual plant setup by a 24-in. by 185-ft. inclined belt conveyor. This main conveyor feeds directly to the 300-ton block plant bin or to a 24-in. by 30-ft. cross belt conveyor leading to the 200-ton ready-mix bin. A new 400-ton bin, supplied by Heltzel, is now being constructed for concrete batching; it has eight compartments, two for cement and six for aggregates. A 7½-cu. yd. batcher is also being installed. The block plant bin has four compartments and is used for storing screenings, pea-rock, coarse rock, and lightweight aggregates.

Cement is unloaded in an undertrack hopper (or truck hopper in the case of truck trailers) and screw-conveyed to a 72-ft. high bucket elevator, which in turn transfers the material to the block plant bin, to a 10-in. by 40-ft. cross screw conveyor serving the ready-mix bin, or to a Heltzel 600-bbl. storage tank. Total bulk cement storage capacity approximates 1,400 bbl. High-level Bindicators are installed on each of the three cement storage facilities.

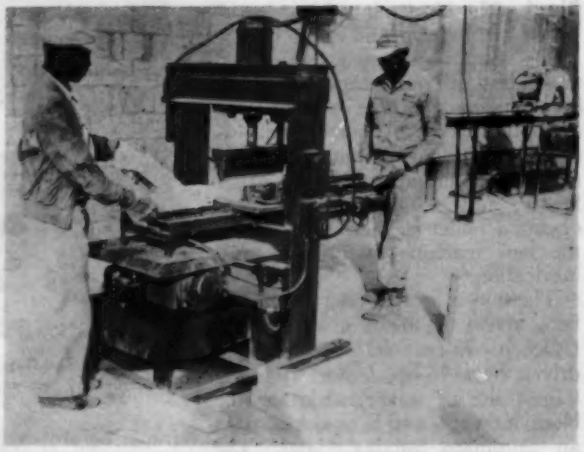
In changing the raw material handling setup, the Rinker firm is now extending the main conveyor to the waterfront, thereby allowing the barges to be unloaded directly to the conveyor. In addition, a stockpile reclaiming tunnel feeding the conveyor will be built.

Ready-Mix Plant The ready-mix plant utilizes a Heltzel two-compartment weigh batcher (one for cement, one for aggregate), which has a capacity of 15,000 lb. Proper weights are determined on a Detecto dial scale. The weigh batcher, as well as the bins, are unloaded by means of manually-operated clamshell gates. Water is discharged to the truck mixer by a Neptune Auto-Stop meter, which automatically shuts off the water at the right amount.

The truck fleet consists of three new Challenge 5-cu. yd. mixers mounted on Reo F22 chassis, as well as other Challenge and Rex 5- and 6-cu. yd. units. These trucks are equipped with Motorola 25-watt two-way radio sets, which were purchased late last year; the base station transmitter, operating on 154.49 megacycles, is located in the company's modern office building. Two-way radio, which has proved useful

Tom Howard, general superintendent, and Rosser Elkins, manager of the Rinker Riviera Co.

Right: Attractive split block are produced on the hydraulically-operated block-splitter.



Below, right: A close-up of the dual plant. The quonset building houses the block machine, and the steam kilns are on the right.

A 5-cu. yd. truck mixer loading up at the batching plant; the trucks are radio-dispatched to expedite deliveries.

The 75-cu. ft. block mixer, the cement bin and the water gauge. The mixer is one of the largest used in the industry.

in expediting deliveries, is installed in each of Rinker's six transit-mix plants.

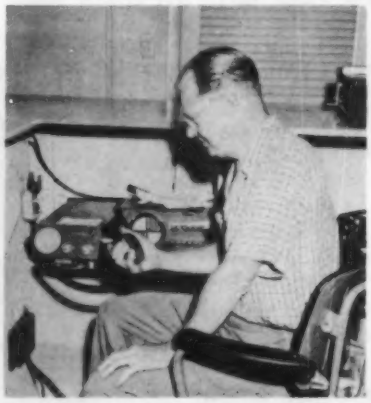
Block Plant The block plant is equipped with a brand new Besser Super Vibrapac machine, which has an hourly capacity of 950 8-in. equivalents. The machine has a Robotron control panel which assures height-density control, a magnetic offbearer, an automatic pallet feeder, and a new type of cam-operated pallet cleaner. In addition, the new machine features oil mist lubrication.

The mixer, located on a mezzanine floor above the block machine, is a GOcorp 75-cu. ft. unit, V-belt driven by a 75-hp. motor. It is the largest size of mixer made for the block industry, and is equipped with an automatic mixing timer. The batching arrangement for the mixer is practically identical to that used in the ready-mix plant; the only difference is that weigh batcher has a smaller capacity—10,000 lb.

Two incidental but interesting features are incorporated in the block operation. One is a small reclaiming bucket elevator mounted adjacent to the block machine, which is used to return "green" block rejects to the mixer during operation. The second feature involves the use of a clean-out chute for the mixer, which discharges the clean-out material to a portable hopper handled by a fork-lift truck (see photo), thereby by-passing the block machine. This arrangement also allows a bin to be emptied rapidly when the plant changes over to a different aggregate.

Another unique feature concerns the air-cleaning of all pallets and racks before they are used again in the operation.

This view shows a special cleanout chute (arrow) for the block mixer, which discharges material to hopper carried on lift truck.



Dispatcher Carl Raschke contacting a ready-mix truck by two-way radio.

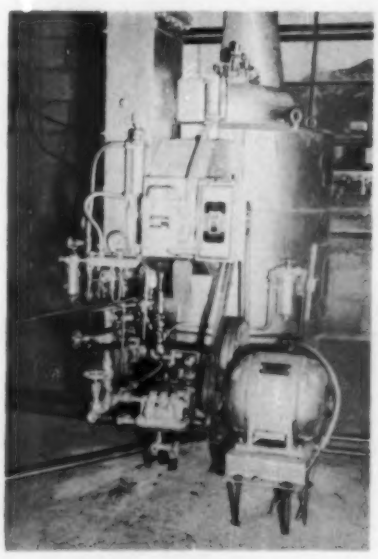
Block are loaded on 108-block racks, and transferred to the curing kilns by a pair of Towmotor LT60 3-ton fork-lift trucks. The curing system consists of a battery of 10 steam cells, each 40 ft. long, 9 ft. 4 in. wide, and 8 ft. high and having a capacity of 11 racks. The kilns are equipped with Standard sliding-carrier-type kiln doors. Steam for curing is supplied by a 60-hp. Littleford Kwiksteam steam generator. Water is obtained from deep wells and softened before being used in the boiler. Following overnight curing in the kiln, the block are yard-cured for at least 28 days.

The new plant produces a complete range of block sizes and types; these are marketed under the name of "Vibra-lite". In addition, split units are produced with a new Bes-Stone automatic block splitter. The firm plans to produce these units in a variety of colors.

Quality control is stressed in the Rinker operation. Tests of both block plant and ready-mixed concrete mixes for gradation and moisture are made several times each day in order that uniform quality and strength may be maintained. Concrete slump tests and compression tests are performed regularly.

The Riviera plant also does steel fabricating and handles various building materials. For the former, power cutting and bending equipment is available.

(Continued on page 216)



Left: Charging the 15,000 lb. weigh batcher in the ready-mix plant.

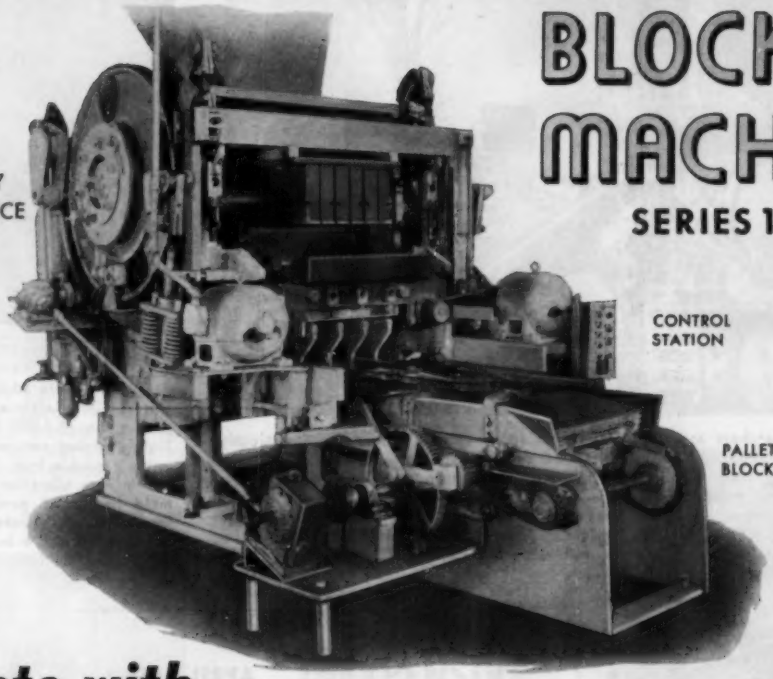
Right: View of the 60-hp. steam generator for block curing.

The World's Newest

NEW
HIGH CAPACITY
WITHOUT SACRIFICE
OF QUALITY

BLOCK MACHINE

SERIES 1955



Complete with OSWALT SERVICES

IMPROVED VIBRATION and machine changes that boost output to a maximum without sacrifice of quality.

NEW SIMPLIFIED HEIGHT and Density Control that automatically maintains block uniformity.

HEAVY DUTY SHOCK-FREE BLOCK EJECTOR and Front-End Pallet Feeder for increasing production efficiency.

OSWALT experience and reputation are your assurance of successful installation.

Ask about our **Package Deal**—how you can build the Oswalt Block Machine in your own plant with our supervision.

FOR many years, we have been developing new ideas and operating features, which were successfully applied to Vibrapac machines to increase productivity and improve block quality.

NOW we have designed our own OSWALT Block Machine that incorporates all of the mechanical advantages provided by Oswalt Service, *plus* major improvements in construction and operation.

The OSWALT Block Machine is sturdily and carefully built from the ground up.

Wider pedestals and thicker frames with a third more metal in the main members assure extra rigid construction and increased stability.

All joined surfaces are machined to precision fit, and the machine parts are heat treated and stress relieved so that the block machine operates in a completely relaxed condition — resulting in longer life and better service.

The OSWALT Block Machine is capable of running steadily at unusually high speeds. It maintains top records of production for any given aggregate. Its performance in our own plant, on continuous day by day block production shows important economies through labor savings and automatic controls.

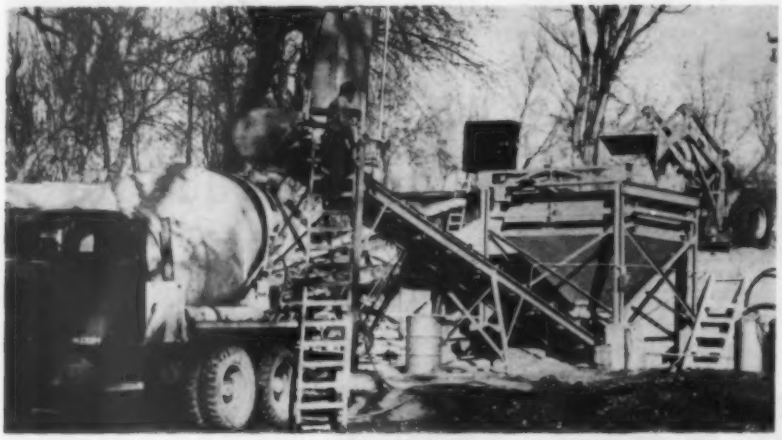
We invite you to visit our new plant to see the OSWALT Block Machine in operation. Write us for further details.

Phones:
EStebrook 8-3666
FOrest 6-3898

OSWALT ENGINEERING SERVICE CORP.

1335 Circle Avenue
FOREST PARK, ILLINOIS

CM New Machinery and Supplies



● The Willis portable batchers are built to rugged specifications but are so ingeniously designed that costs are reduced considerably. Many concerns have found it feasible, and profitable, to employ more than one of the units in their operations. The firm says that costs are reduced and production speeded up, and yet batching is accomplished to exact specifications every time. Available are a 20,000 lb. size of 5 yd. capacity and a 30,000 lb. model of 7 yd. capacity. Both units come complete with belt conveyor, water meter, motor, and supporting structure. A hot water heater that will deliver 16,000 gallons of hot water per hour is also available. (101)

● General Engines Co. has completed testing and now is marketing a new high production concrete adobe slump brick machine. This R-100 Rainbow Rock machine gives production of 6,000 Rainbow rocks per day. Tightly sealed compressed air systems guarantee trouble-free low-cost performance. The intense vibration is concentrated in the mold box which produces a beautiful, uniform product. All-steel, electrically welded construction and a heavy-duty 1 hp. electric motor assure a long life. (102)

● The new General Electric FM mobile and base station 2-way radio is shown here in a standard 17-in. housing in front-mount condition. This unit has a 27-33 watt output. (103)

● The Randles & Reynolds Machine Co. adjustable masonry drill does away with broken, jagged, makeshift hole drilling in masonry surfaces with this tool that makes a neat, cleanly cut, accurately placed opening. (104)

APRIL 1955

MORE INFORMATION PLEASE

THE CONCRETE MANUFACTURER
431 S. DEARBORN ST.
CHICAGO 5, ILLINOIS

Please send more information on items described in editorial columns of this issue, as circled below.

101 102 103 104 105 106 107 108 109 110
111 112 113 114 115 116 117 118 119 120
121 122 123 124 125

Name_____ Title_____

Company_____

Address_____

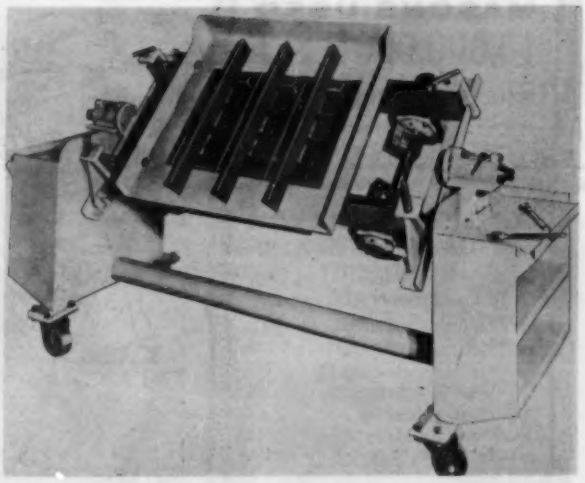
City_____ Zone_____ State_____

● The Lincoln Electric Co. introduces this new universal combination arc welder, the Idealarc, which provides a choice of either AC or DC current. It is also available as an AC unit without the DC current. ⍋ (106)

● Silent Hoist & Crane Co. introduces their Liftruk, a concrete pipe handler available in 4 sizes—5-, 7½-, 10-, and 15-ton capacities. It handles all sizes of pipe including 66-, 72-, 84-, and 96-in. diameter; and larger sizes to order. ⍋ (107)

● Grading either coarse or fine material is a snap when using the Wheeler testing vibrator which is designed for sieves from 6 to 16 in. in diameter. ⍋ (108)

● This mold repair table made by the Bergen Machine & Tool Co., Inc., is ruggedly built, mounted on husky caster wheels, and has 2 sets of shelves for tools and supplies (optional). It puts the mold in any desired position easily and assures that the mold will neither slip nor fall. Working time is thus cut considerably. → (105)



"BIG TIME" ADVANTAGES

IN THIS COMPACT AND RELATIVELY INEXPENSIVE

KENT *SUPER* BLOCKMAKER

Here is an entirely new semi-automatic machine ideally suited for SMALL and MEDIUM block plants.

A SPECIAL air cylinder-powered press head makes possible a faster cycle and assures blocks of uniform height and equal density regardless of the material used.

PRICED BELOW any machine of comparable performance, the SUPER BLOCKMAKER consistently produces blocks at a rate of 5 per minute from any aggregate and has a peak output of 6 blocks per minute.

Equal delivery of aggregate to the mold box is effected by agitation and mold box vibration assures uniform block density.

A simple push of a button starts cycle during which various operations are automatically handled in sequence.

You'll be surprisingly pleased at the comparative low cost of this machine. Write TODAY for illustrated circular.

The **KENT MACHINE COMPANY**

CUYAHOGA FALLS, OHIO

CONCRETE PRODUCTS MACHINERY SINCE 1925

MASONS USED
10,000,000 FEET
of WAL-LOK
Horizontal Mortar
Joint Reinforcing
LAST YEAR

FOR BETTER, STRONGER WALLS MORTAR JOINT REINFORCING IS A NECESSITY

- To minimize shrinkage cracks.
- To withstand side pressure.
- To increase wall strength.
- To reduce cracks caused by foundation failures.

The effectiveness of any reinforcing depends not only on the strength of the wire but also on its bond to the mortar. For maximum bondage to mortar, ALL WAL-LOK stretcher rods are deformed and knurled, cross bars project and are galvanized.

NOW **2** GRADES and CORNERS

EXTRA HEAVY
3/16 inch Side Rods
No. 9 Gauge Galvanized Cross Rods
and
SuperStandard
No. 8 Gauge Side Rods
No. 10 Gauge Galvanized Cross Rods

Convenient 300 FOOT Bundles
(25-12 foot sections)

BOTH WAL-LOK GRADES COMPLY
with the recommendations of National Bureau of Standards Bulletin No. 3079 and A.S.T.M. Spec. No. A82-34.

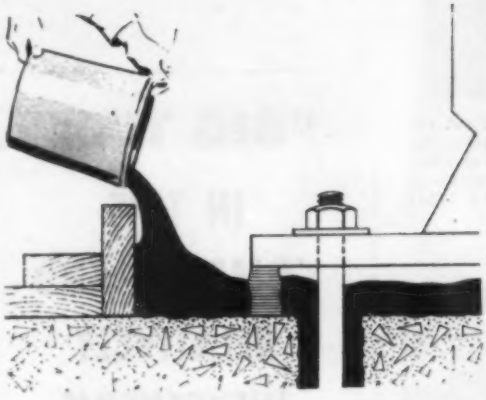
POSITIVE PROOF
Tests conducted by the Research Foundation of the University of Toledo offer positive proof of these statements. To our knowledge, Wal-Lok is the only horizontal mortar joint reinforcing based on scientific research

COLD PROCESS PEENING
The cold process of peening to deform and knurl, developed by Adrian Peerless, is the one method that does not impair tensile strength.

WRITE TODAY for your copy of the Adrian Peerless 4-page folder on Wal-Lok. It contains the data from the Research Foundation tests, specifications, additional advantages and further information about Wal-Lok masonry wall reinforcing mesh.

WAL-LOK

ADRIAN PEERLESS, INC.
1498 E. Mich. St., Adrian, Mich.



● The top illustration shows new ready-to-use Embeco pre-mixed grout, made by The Master Builders Co., being added as it comes from the container directly to the mixer. Only water is needed to produce a flowable grouting mix that is easily placed. Time savings are reported to be great. The bottom illustration shows flowable Embeco grout being placed beneath a machinery bedplate. According to the manufacturer, it does not shrink upon hardening thus assuring maximum contact with the bedplate. Composed of precisely-blended, laboratory-tested ingredients, these products are easy to use and convenient to transport and handle at the job site. The manufacturer claims Embeco mortar and grout offer higher conpressive and impact-resistant strength, ductility, oil and water resistance, and faster handening than plain sand-cement mixes. ← (109)

Save

TRUCK TIME REJECT LOADS
with IMC INSTANT MOISTURE CONTROL
...Gives INSTANT aggregate moisture readings.

The Instant Moisture Control, installed in your concrete batching plant, will tell your operator instantly and *at a glance* what corrections to make in each batch for the moisture in the aggregate. Turn out *specification* batches consistently. End wasted truck mixer time adding water to too-dry loads, or disposing of rejected too-wet loads. The IMC keeps a permanent record, too, telling you the amount of moisture you have been buying in your aggregate.

Write for further information

The quick-reading dial of the IMC is the key to correct yield, better slump control, and more economical concrete operations.

STOP CASH LOSSES IN YOUR OPERATION...INSTALL IMC NOW

IMC
INSTANT MOISTURE CONTROL
A DIVISION OF COLORADO PREMIX CONCRETE CO., 1021 W. MISSISSIPPI, DENVER, COLORADO

SMITH
Truck Mixers & Agitators

with 2-SPEED Transmissions as STANDARD Equipment

Smith puts 2-speed transmissions in ALL Smith Truck Mixers because they help you to mix and discharge quality concrete... also lower your maintenance costs.

There is a minimum amount of mixing required to produce quality concrete — ASTM specifications say 50 revolutions — but there is also a maximum amount of mixing allowed. Without a 2-speed transmission, it is almost impossible to throttle down low enough to stay in the required mixing range on medium length hauls, much less on long hauls, and still have proper charging speeds available. If you agitate, there is never a case where you don't need the 2-speed transmission.

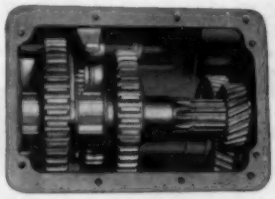
Discharge is affected by drum speed — especially with low slump concrete which is sticky and does not want to flow. A slow speed, from 3 to 5 r.p.m., usually works best. You can get this range of speed easily, and without laboring the engine, with the Smith 2-speed transmissions. This is also true for curb and gutter jobs and narrow form pours where absolute control is necessary.

Maintenance costs for the entire mixer are lowered because of the 2-speed transmission. The engine runs at an efficient speed, minimizing sludge and carbon formation. You turn the drum only as much as necessary. Fewer revolutions mean less wear.

Remember, there are over 20 sizes and styles of Smith Truck Mixers tailor-made to meet your individual needs . . . and they all have 2-speed transmissions as standard equipment. For complete details, contact your nearby Smith distributor or write:

on **GEAR DRIVE** *Mixers*

The finest transmission in any mixer. Foote Bros. aircraft specification, 2-speed transmission, helical cut gears and ground shafts heat-treated to 600 Brinell.

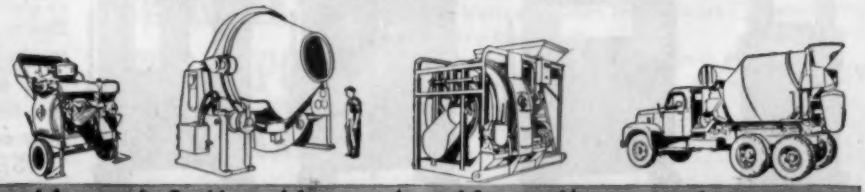


on **CHAIN DRIVE** *Mixers*

Clark heavy duty 2-speed transmission, equipped with special remote control shifting tower—maximum power in a minimum space.

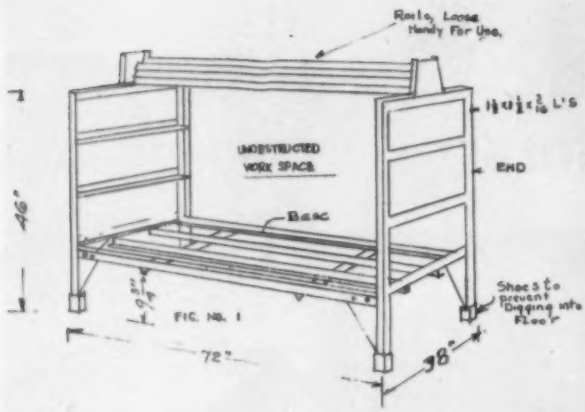
THE T. L. SMITH CO. • 2887 N. 32nd Street • Milwaukee 10, Wis., U. S. A.

Affiliated with ESSICK MANUFACTURING CO., Los Angeles, California



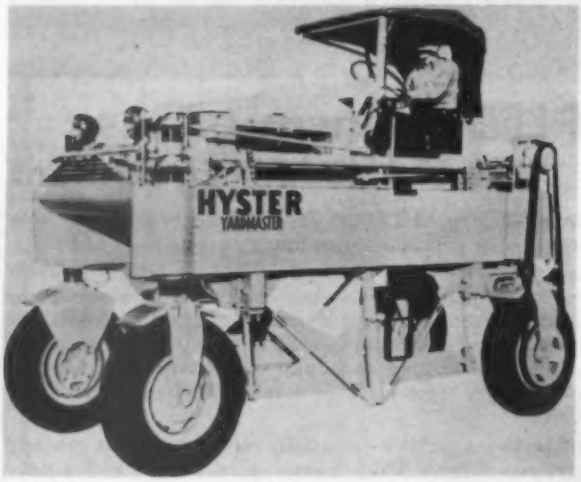
Builders of Better Mixers for More Than 50 Years

A 8341-1P

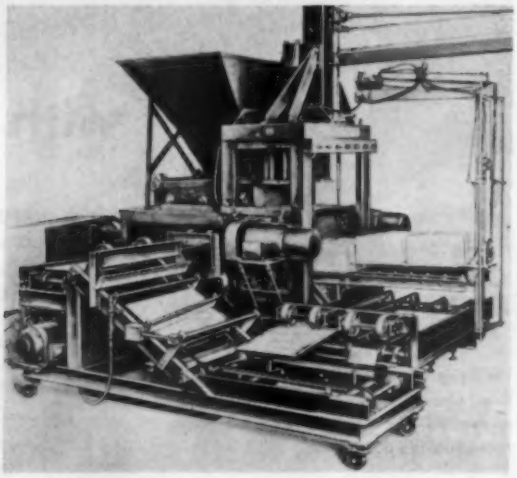


● This block rack made by the R. K. Tyra Corp. has some unusual and convenient features that extend its usefulness considerably. The rack has removable rails that provide a firm base for blocks but which can be removed for an unobstructed working space. When not in use the rails are stored on a special rack at the top of the unit so that they are available at any time. The rack has shoes which prevent it from digging into the floor. ▲ (110)

● The P-51 over-track portable conveyor made by the Andrews Machine Co., unloads cement and other materials from a covered loaded hopper car in approximately 2 hours. Used in combination with an Andrews tubular portable conveyor or any other standard elevator, it enables one man to set up the combination and load into storage bins, trucks, or stock piles at any point the car may be spotted. ▲ (111)



● The Hyster Co. has announced a new 20,000 lb. capacity straddle truck. The versatile new unit, model MD, has a lifting capacity 2000 lb. greater than that of the previous similar M3 model of 18,000 lb. capacity. Power is supplied from a 91 hp. Hercules model JXE-3 "L" engine. Mechanical improvements include a 12-in. clutch, vacuum power brakes, and heavy-duty hypoid differential. Especially useful for handling concrete blocks and building members. ▲ (112)



● Lith-I-Bar Co. has released their new Lith-I-Block automatic front pallet return. With the new unit many extra labor-saving advantages may be realized. The unit is self-contained and no additional fuse boxes or controls are necessary. A magnetic starter is supplied for the motor. It is made for either right- or left-hand, and is ball-bearing equipped throughout. ▲ (113)

LT-500 QC-200 QC-125 QC-100

FORNEY

Serves the Entire Industry with a Compression Tester for Every Purpose . . . Cubes . . . Cylinders . . . Blocks . . . Beams . . . Lintels . . . Brick . . . Pipe up to Seventy-two Inches Diameter.

They tell what your products test at any time you want to know, and let your customers and prospects

SEE FOR THEMSELVES

WRITE FOR BULLETIN 504

FORNEY'S, INC.

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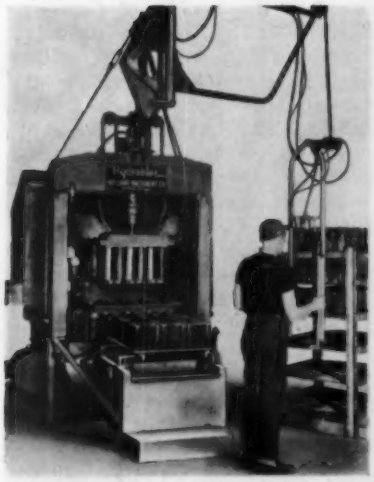
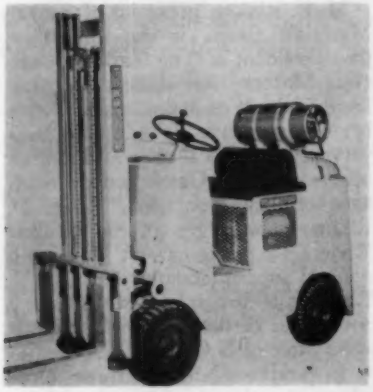


● The ultra-simple Hydrobloc concrete block machine made by the Holland Machinery Co., makes 3 blocks per cycle and operates at more than 4 cycles per minute. The hydraulically operated unit is cam controlled and fully automatic. (114)

● Faster steam cleaning on all cleaning work is claimed for the new, improved version of the Malsbary Model 250 high-pressure combination cleaner. It delivers pressures up to 300 p.s.i., and features larger ¾-in. I.D. coils. (115)



● This Towmotor lift truck can now be equipped with either gasoline or LP gas engines. The LP gas system offers lower fuel cost, longer engine life, complete fuel combustion, and minimum carbon monoxide. (116)

18 large producers in one state alone use

Hi-Lo CONCRETE TRANSPORT MIXER CO.

This demand is based upon profit-making experience!

In Florida, a state noted for volume production of ready-mixed concrete, 18 of the largest producers use Hi-Lo stationary drum truck mixers. They've found that Hi-Lo produces more profit than many other makes, yet sells for several hundred dollars *less!* You get it for less because Hi-Lo is sold *direct to you.* The customary percentage usually given to distributors stays in your pocket in in the form of savings. This rugged, dependable mixer is constructed to operate for years with only routine maintenance. Your customers will like Hi-Lo's exclusive feature: Visible Mixing Action. You can *see* the mix, make sure it's exactly right every time. Try Hi-Lo. It will take only a few trips to see why it's won such acceptance—in Florida and throughout the world!

THESE FEATURES MAKE THE DIFFERENCE!

POWER TAKE-OFF DRIVE—save money on cost of separate engine, gas, maintenance.

REPLACEABLE LINERS, of abrasive-resistant steel. You never have to replace the drum!

FULL 180° RADIUS DEEP-CUT SWING CHUTE, for fast discharge.

SLIDING GATE for accurate control. No seal to replace!

NON-LEAKING, SELF-TIGHTENING PACKING GLANDS, last for years.

3 MIXER 4 AGITATOR

DEMAND THE BADGE OF DEPENDABILITY

MAIL TODAY for complete prices, terms, descriptive literature

CONCRETE TRANSPORT MIXER CO.

4989 FYLER AVE., ST. LOUIS 9, MO.

FLanders 2-7800

Please rush full information, prices and terms on the following:

☐ Hi-Lo Stationary Drum Truck Mixers ☐ Water Meters

☐ Batching Equipment

☐ New Rocket Revolving Drum Truck Mixer

☐ Material Handling Equipment

CM

Name_____

Firm_____

Address_____

City_____ State_____

New Literature

UNLOADING with the Hydro-Lift made by the *G & H Machine Co.* enables the operator to achieve perfect control of load at all times and unload one lift per minute. It offers positive hydraulic power driven by engine power take-off. **(117)**

MAINTENANCE AND REPAIR is effectively achieved with use of "Bulldog" special applicator bars made by *Allied Steel & Tractor Products, Inc.* They are shock and abrasive resistant, tough, long wearing, and they weld easily. **(118)**

BETTER PIPE at less cost is the claim made by the *George W. Hoffmann Co.* for their "steel-strong" concrete pipe called Vibrapipe. To get information on this product which can be economically made at any location give the size and length pipe desired to make, manufacturing equipment available, and desired production capacity. **(119)**

THE COOLING SYSTEM of an internal combustion engine is discussed in this booklet of *Cummins Engine Co., Inc.* It points out many interesting facts regarding the system's effect on other parts of the motor. **(120)**

BOILER REFRACTORIES and the easiest way to choose the correct one for your application is the subject to this brochure by the *Refractories Division* of *The Babcock & Wilcox Co.* It describes the crucial properties to be desired in refractories and the way to check for them. **(121)**

PARTS AND EQUIPMENT catalog of products made by the *Bergen Machine & Tool Co., Inc.,* is offered. The contents consists of many Bergen improvements developed over the years for block machines and also plant operation and maintenance equipment they handle. **(122)**

MASONRY WALLS are strongly reinforced when using Wal-Lok made by *Adrian Peerless, Inc.* This folder gives complete specifications for this popular tool for stronger walls. It also gives the results of an extensive test on concrete wall reinforcing conducted by the Univ. of Toledo. **(123)**

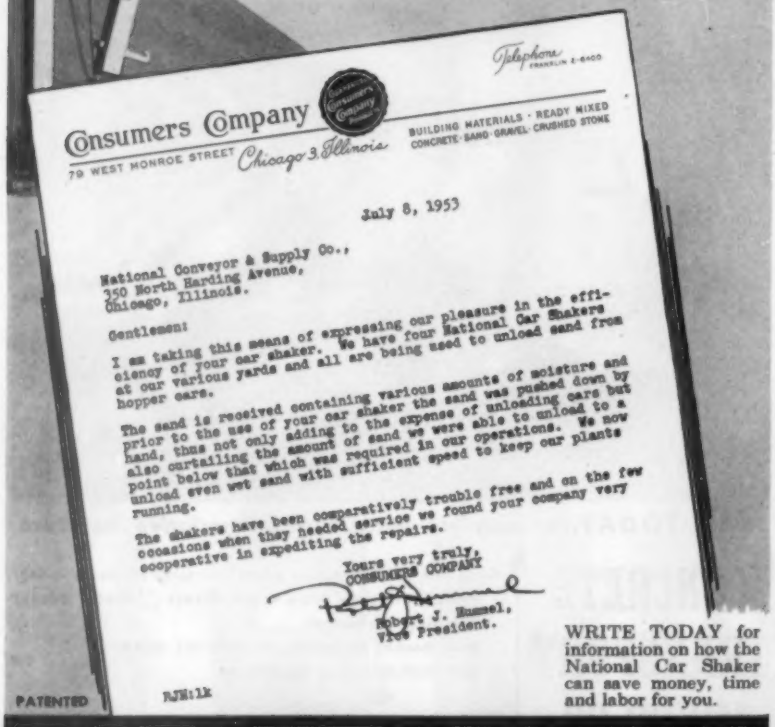
AUTOCLAVE SYSTEM for high-pressure curing is treated in this pamphlet put out by the *Wm. Bros. Boiler & Mfg. Co.* If you're considering a change-over in the way or mechanization of steam curing your blocks, this should prove very interesting. **(124)**

CONCRETE EQUIPMENT made by the *Stow Mfg. Co.* is listed in this catalog. Complete data is given on their universal electric and gasoline concrete vibrators, portable concrete grinders, gasoline and electric rotary trowels, and concrete vibrating screens. **(125)**

Faster Unloading with the National Car Shaker

FASTER, SAFER, LOWER-COST UNLOADING with the *low cost* National Car Shaker. Unloads a car in as little as six minutes with no man required in or under the car, under normal conditions. Unloads coal, coke, cinders, sand, stone, aggregates and all bulk materials.

Used and time-tested by hundreds of firms, both large and small. The time saved by Consumers Company, (see letter below) is typical.



Consumers Company
79 WEST MONROE STREET Chicago 3, Illinois
BUILDING MATERIALS · READY MIXED CONCRETE · SAND · GRAVEL · CRUSHED STONE
Telephone FRANKLIN 2-6400

July 8, 1953

National Conveyor & Supply Co.,
350 North Harding Avenue,
Chicago, Illinois.

Gentlemen:

I am taking this means of expressing our pleasure in the efficiency of your car shaker. We have four National Car Shakers at our various yards and all are being used to unload sand from hopper cars.

The sand is received containing various amounts of moisture and prior to the use of your car shaker the sand was pushed down by hand, thus not only adding to the expense of unloading cars but also curtailing the amount of sand we were able to unload to a point below that which was required in our operations. We now unload even wet sand with sufficient speed to keep our plants running.

The shakers have been comparatively trouble free and on the few occasions when they needed service we found your company very cooperative in expediting the repairs.

Yours very truly,
CONSUMERS COMPANY
Robert J. Hummel,
Vice President.

RJH:lk

PATENTED

WRITE TODAY for information on how the National Car Shaker can save money, time and labor for you.

National Conveyor & Supply Company

348 N. HARDING AVENUE CHICAGO 24, ILLINOIS

Rinker

(Continued from page 208)

M. E. Rinker, president of Rinker Materials Corp., is the immediate past president of The National Concrete Masonry Association and president of the West Palm Beach Chamber of Commerce. In addition, he is very active in local civic and church affairs. Allen T. Gay is general manager of the corporation. Rosser D. Elkins is manager of the Rinker Riviera Co.; Thomas W. Howard is general superintendent, and Carl R. Raschke is dispatcher. Mr. Elkins is a member of the technical problems committee of N.C.M.A.

In addition to the three block plants already referred to, the Rinker firm also operates transit-mix plants at Vero Beach, Fort Pierce, West Palm Beach, Lake Worth, and Stuart, Fla.

CHARLES R. COX

Portrait by Fabian Bachrach

"I urge every executive..."

"I know of no better method for each citizen to protect the American way of life than by building his own economic security and by helping his Government to keep financially sound. Both these results can be accomplished through the Payroll Savings Plan. I urge every executive in the nation to give this Plan his active and vigorous support."

CHARLES R. COX, ***President, Kennecott Copper Corporation***

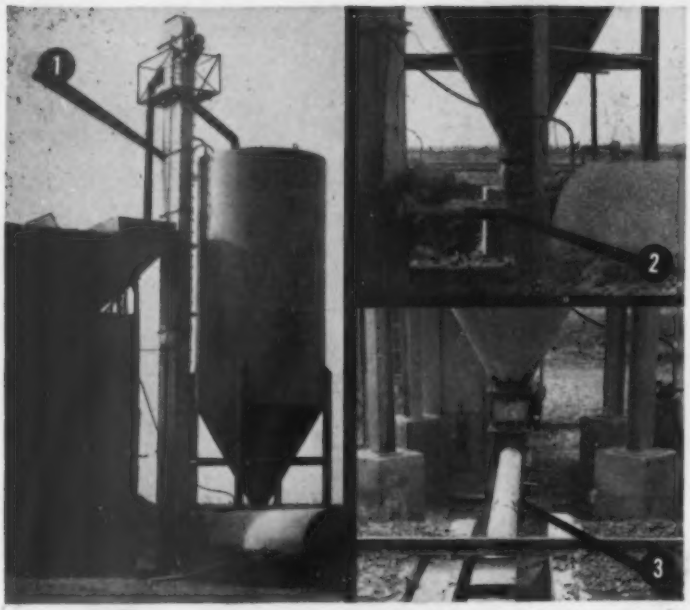
With the active cooperation of Mr. Cox, Kennecott conducted a person-to-person canvass which put a Payroll Savings Application in the hands of *every* one of Kennecott's 20,000 employees. The men and women of Kennecott did the rest. Country-wide participation in Kennecott's Payroll Plan rose from 24% to 52%.

Your State Director, U. S. Treasury Department, is ready to help you install a Payroll Savings Plan, or show you how to build participation in an existing Plan through a simple person-to-person canvass. Write today to Savings Bonds Division, U. S. Treasury Department, Washington, D. C.

The United States Government does not pay for this advertising. The Treasury Department, thanks, for their patriotic donation, the Advertising Council and

Pit and Quarry Publications, Inc.

BAUGHMAN CONVEYORS and ELEVATORS



for Ready-Mix Concrete Plants

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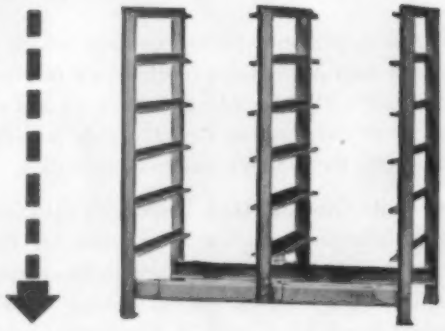
Your best buy



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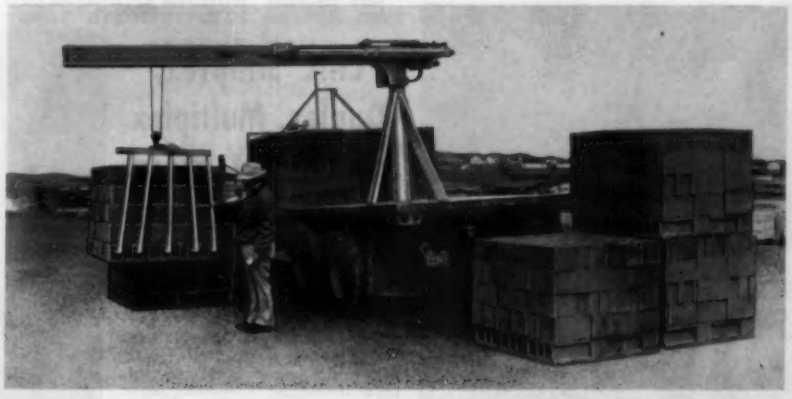

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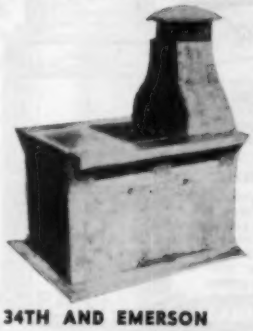

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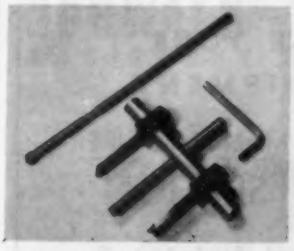

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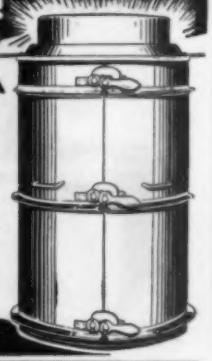

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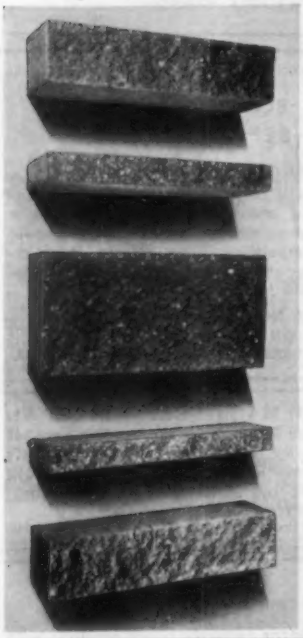

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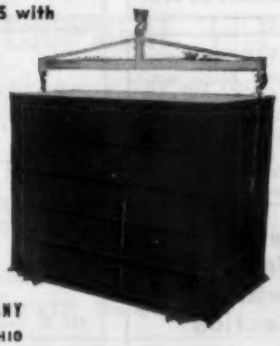

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Very Cheap.
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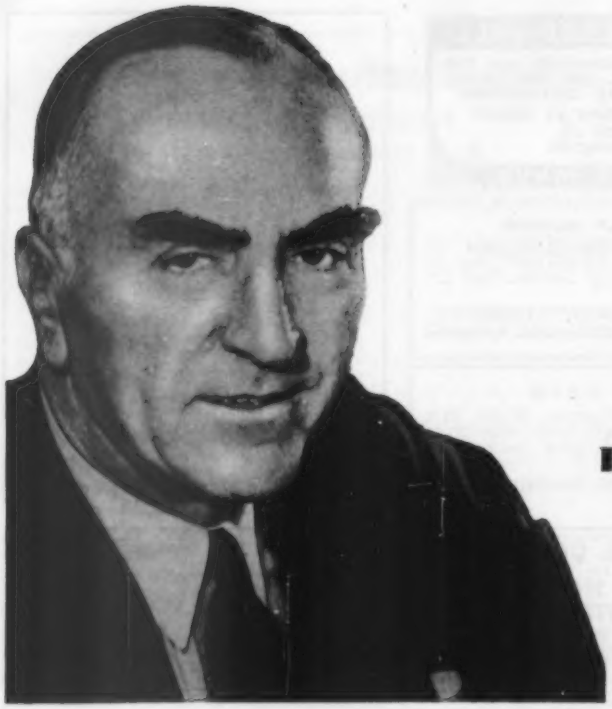

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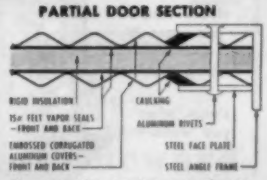

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by Promoting SOFFIT Floor Filler Block

Provides a Natural Base for RADIANT HEAT Jobs!

Now — You can add to your profits by supplying customers with Soffit Block for floors and roofs, in addition to Vibrapac Block for walls. Soffit Block floors are permanent and fireproof. They form an ideal base for installing heating coils for radiant heat jobs. The textured and patterned ceiling has maximum acoustical and insulation values . . . can be plastered, if desired.

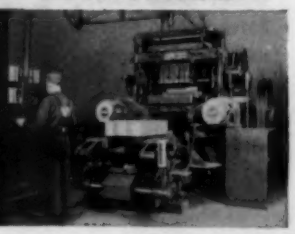
Produce SOFFIT Block on Your Besser Vibrapac

The same machine that makes high quality wall block, also produces Soffit Block, using the same set of Plain Pallets.

Write for Bulletin No. 77

BESSER COMPANY

ALPENA, MICHIGAN, U. S. A.
Complete Equipment for Concrete Block Plants



THE NEW SMITH *THREE-IN-ONE* SEPTIC TANK FORM

ADAPTABLE TO PRODUCTION
OF 500, 600 AND 750
GALLON TANKS

This is a one piece tank, pours and strips upright. All sections assembled with wedge bolts for easier stripping. Handled by 2″ holes in wall directly on center of each side 19″ down from top, this lets your hoist go down into tank and eliminates the need for a high rig.

Form includes: Pouring Pan, three section septic tank lid pans and pick up bar for handling. Inside form has tapered wedge strips in each corner that slide out easily allowing plenty of clearance for stripping.

By adding sections to the standard 500 gallon form you can build up the form to pour 600 and 750 gallon tanks.

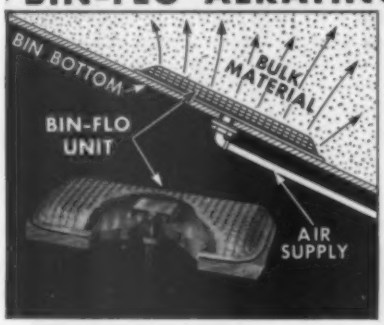
★

PRICES (STANDARD FORM) $650.00 F.O.B. DALTON, GA.

WRITE TODAY FOR COMPLETE DETAILS

COOK & INGLE CONCRETE PRODUCTS
305 FERNWOOD AVE. Phone 1697 DALTON, GEORGIA

BIN-FLO AERATING UNIT



Provides Steady Flow of Dry, Finely Ground Materials which tend to bridge in storage. Uses only small amount low-pressure air.

BIN-DICATOR BIN LEVEL INDICATOR

For All Bulk Materials

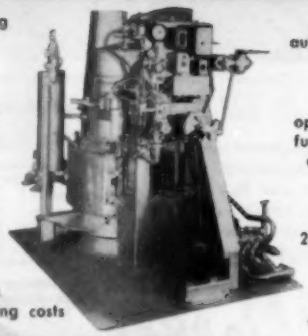
signals change in level; automatically starts and stops filling and emptying equipment.

THE BIN-DICATOR CO.
13946-W1 Korchaval • Detroit 15, Mich.

NEW DETAIL DATA BOOK FREE

Get **STEAM QUICK** with **"Kwik-Steam"**
(IN 2 MINUTES)
for curing Blocks and Pipe
with the Littleford
"KWIK-STEAM" Vapor-Clarkson Generator

Modulating controls
fully automatic
steam where you want it
operates at full or half capacity
steam when you want it
sizes from 20 to 165 BHP
cuts manufacturing costs
speeds up curing cycle



You get steam in 2 minutes flat from a cold start with the Littleford "Kwik-Steam" Generators. And you save real money on concrete manufacturing costs, because the "Kwik-Steam" reduces labor costs 50% (no skilled labor required) and speeds up the curing cycle. There's a size for your plant. Send for descriptive bulletin.

Send for Bulletin EE-22

LB LITTLEFORD
LITTLEFORD BROS., INC.
453 E. Pearl St., Cincinnati 2, Ohio

Speed Up Hand Work with the BIG BULLY Air Hammer

- Clean Equipment
- Scrape Dry Concrete
- Clean Forms

Weight only 50 oz. 6 in. length, fits hand easily. Exclusive metering trigger delivers 0 to 9000 blows per minute. 28 tools available for 100 different jobs. Special tools made at your request.

Write for Complete Information Today

Clean Mixing Trucks Faster

Clean Fragile Mixing Equipment Safely

Vibrating Concrete From Hopper

SUPERIOR PNEUMATIC & MANUFACTURING, INC.

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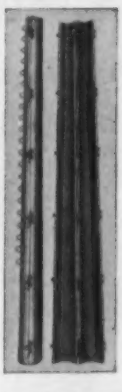
Cleveland 25, Ohio

West Coast Office
15615 Arrow Highway
Azusa, California

Canadian Office
347 Cannon Street, East
Hamilton, Ontario



EXTRA Concrete Profits!

This form produces this LARSEN "Lifetime" Concrete Post

STRONG • DURABLE • LIGHTWEIGHT
Made of Cold Rolled Sheet Steel

This low-investment business-booster is easily set up . . . requires no additional space, and no power. Makes pre-stressed posts in large demand everywhere. Expand your income with this sure-fire item!

Write Today for Full Details to

CONCRETE POST FORM COMPANY
Cedar Falls, Iowa

NOW MORE THAN 150 LICENSED MANUFACTURERS Producing

Patented

homeward Concrete STEPS

A Small Investment That Pays Big Dividends

Homeward all metal forms are precision built to produce a product that requires no hand finishing.

The exclusive franchise for your territory may still be open.

For Complete Information Write

ROGER F. WILLIAMS, Licensor
3420 S. W. 9th St. Des Moines (15), Ia.

homeward is a Registered TRADE MARK.

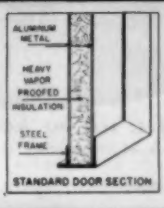
SAVE FUEL • REDUCE CURING TIME
CUT COSTS • UP PROFITS
with *Standard* KILN DOORS!

WHERE AISLE SPACE IS LIMITED STANDARD sliding doors need no aisle space. The carrier-type door (shown) requires 15" minimum clearance above top of door opening. A vertical sliding door, counterweighted for easy opening, is also available.

WHERE HINGE-TYPE DOORS ARE PREFERRED Choose from two STANDARD hinge-type doors. The top-hinging door (shown) can be used when there's insufficient room at sides of door. The conventional side-hinging door has rugged hinges and positive-seal lock.

CHECK THESE FEATURES

- ✓ **Heavy Aluminum Sheets on Both Sides of Thick Vapor Proofed Insulation.**
- ✓ **Rugged Steel Frame.**



STANDARD DOOR SECTION

Get the Best — Send for Details Now

STANDARD DRY KILN COMPANY
P. O. BOX 5708 . . . . INDIANAPOLIS 21, IND.

Automatic Hydraulic CHUTE CONTROL DYNA CHUTE

Gives Unlimited Mobility to Your Mixer Chute

Elevates the delivery chute in less than 10 seconds. Fits new or existing Transit Concrete Mixers and does a reliable job of lifting in a jiffy. Hydraulically powered by truck battery.

- **AUTOMATIC** — Smooth power positioning of your mixer chute to just the right delivery height — fast and easy.
- **HYDRAULIC** — Controls, holds . . . and does all the work instantly at the flick of a switch.
- **RUGGED** — Built to raise a ton or more — you don't take "muscle men" from other jobs.
- **SAFE** — No struggle with the chute to move it up or down. No fiddling with pins to plug the slip joint spacer holes.

MONARCH
Road Machinery Co.
HYDRAULIC DIVISION
"Quality Machinery Since 1856"
1331 Michigan St., N. E.
GRAND RAPIDS, MICHIGAN

Get the complete story. We'll be glad to send complete information and furnish dealer's name in your area.

MAIL TODAY

YES, TELL ME MORE. I want to eliminate the back breaking job of lifting mixer chutes. Where can I get the Dyna-Chute Kit?

NAME _____

COMPANY _____

ADDRESS _____

CITY _____ STATE _____

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*See also Detailed Information in 1954 Pit and Quarry HANDBOOK and CONCRETE INDUSTRIES YEARBOOK

More ready-mixed concrete is sold in JAEGER truck mixers than by any other method

142 CU. YDS. BETWEEN 7 AND 10:30 A.M. DAILY: On their housing project at San Jose, Calif., Eichler Homes, Inc. scheduled each day to start with the pouring of foundations and floor slabs. Average daily requirement was 142 cu. yds. By starting seven Jaeger 4½ yd. "Mix Plus" truck mixers at 7 o'clock, San Jose Transit-Mix Concrete completed each day's pour by not later than 10:30 in the morning.

More ready-mixed concrete is sold in Jaeger truck mixers than by any other method. Ask your Jaeger distributor to show you why—or write for complete information.

THE JAEGER MACHINE COMPANY

602 Dublin Avenue, Columbus 16, Ohio

FRONT END LOADERS • COMPRESSORS • PUMPS • CONCRETE MIXERS • PAVING MACHINES

Pasadena Pioneers Bridge. California Department of Public Works, Division of Highways. Guy F. Atkinson Company, Builders.

High, wide and handsome

"High, wide and handsome" aptly describes the Pasadena Pioneers Bridge. It equally describes today's bolder and more imaginative approach to concrete design by architects and engineers.

Use of this strong, fireproof and enduring material is further encouraged by its ready and dependable supply. Few growing communities now fail to provide ready mixed concrete, produced to rigid specifications and delivered in truck mixers of certified design, capacity, mixing speed and accuracy of water control.

You have a right to insist on this Rating Plate. It certifies compliance with high industry standards maintained for your protection by the Truck Mixer Manufacturers Bureau.

These manufacturers comply with Bureau standards:

BLAW-KNOX EQUIPMENT DIVISION
Pittsburgh, Pa.

CHAIN BELT COMPANY
Milwaukee, Wis.

CHALLENGE MANUFACTURING CO.
Los Angeles, Calif.

CONCRETE TRANSPORT MIXER CO.
St. Louis, Mo.

CONSTRUCTION MACHINERY CO.
Waterloo, Iowa

IMPERIAL CONSTRUCTION EQUIPMENT CO.
Melrose Park, Ill.

THE JAEGER MACHINE COMPANY
Columbus, Ohio

THE T. L. SMITH COMPANY
Milwaukee, Wis.

WILLARD CONCRETE MACHINERY CO., LTD.
Lynwood, Calif.

WORTHINGTON CORPORATION
Plainfield, N. J.

Still the QUALITY PRODUCTION Champion

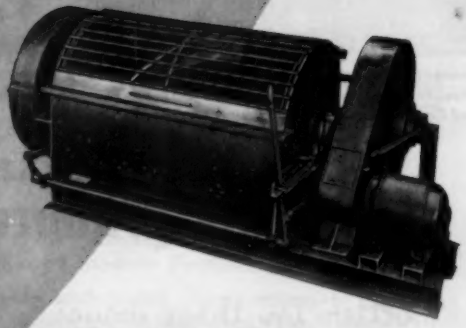
LITH-I-BLOCK MACHINE

- NEW CENTRAL CABINET FOR MAJOR CONTROLS
- NEW DUAL-ECCENTRIC AGITATOR DRIVE
- POSITIVE SIZE AND DENSITY CONTROL
- QUICK-CHANGE MOLD BOX
- STANDARD SIZE PLAIN STEEL PALLETS

The Automatic Front Pallet Return makes possible fast, efficient one-man operation. It may be used with any size Lith-I-Block Machine, old or new, and is available for either right or left hand feed. Lith-I-Block Machines are made in five standard models. There's a size to fit the needs of any producer, large or small.

LITH-I-BLOCK

ONLY THE LITH-I-BLOCK MACHINE MAKES *BONUS QUALITY* LITH-I-BLOCK



LITH-I-MIXER

Advanced design features and rugged construction make this the ideal mixer for block plant operation. Tough, long-wearing, Ni-Hard liners and blades are used in both 30 and 50 cubic foot models.

SEND TODAY for detailed bulletins (Nos. C-102, C-103) on Lith-I-Block Machine and Lith-I-Mixer — a post card will do it.

ONE PIECE OF EQUIPMENT OR A COMPLETE PLANT LAYOUT

LITH-I-BAR CO.

HOLLAND, MICHIGAN

SALES AND SERVICE THE WORLD OVER

General Hospital Neurological Building, Philadelphia, Penna. Archt.—Harbeson, Hough, Livingston & Larson; Contr.—McCloskey & Co., Inc.—both of Philadelphia. Pozzolith Ready-Mixed Concrete supplied by The Warner Co., Philadelphia.

St. Joseph's Hospital Addition, Burbank, Calif. Archt.—John W. Maloney, Seattle, Wash.; Contr.—Pozzo Construction Co., Los Angeles. Pozzolith Ready-Mixed Concrete supplied by Jewel City Ready-Mix Co., Beverly Hills.

hospitals

Permanente Foundation Hospital, Los Angeles, Calif. Archt.—Wolff and Phillips, Portland, Oregon; Contr.—C. L. Peck, Los Angeles. Pozzolith Ready-Mixed Concrete supplied by Graham Brothers Co., Los Angeles.

Veteran's Hospital, New Orleans, La. Archts.—Favrot, Reed, Mathes & Bergman, New Orleans; Faulkner, Kingsbury & Stenhouse, Washington, D.C.; Contr.—Robert E. McKee, Dallas, Tex. Pozzolith Concrete batched at job site.

concrete produced with POZZOLITH

better in these ways:

- greater durability
- reduced shrinkage
- lower permeability
- minimized segregation
- increased bond to steel

because...

Pozzolith enables builders to obtain better quality concrete—with maximum economy—because it:

1. Reduces *unit water content*—most important basic factor affecting concrete quality*—by 15%.
2. Entrains the *optimum* amount of air.
3. Fully complies with the water-cement ratio law—basis of ACI and ASTM procedures of design, specification and production of concrete.

Full information on Pozzolith and "see-for-yourself" demonstration kit sent upon request.

*See Bureau of Reclamation's current Concrete Manual, Page 130.

The MASTER BUILDERS Co

Subsidiary of American-Marietta Company

BROADCAST PIT and QUARRY SECTION

PIT AND QUARRY • 431 S. DEARBORN ST. • CHICAGO 5, ILL.

ADVERTISING RATE PER ISSUE: $9 A COLUMN INCH. LOWER RATES FOR LARGER SPACE USED AND/OR ON A CONTRACT BASIS. WRITE FOR RATE CARD.

CLOSING DATE: 20th OF THE MONTH PRECEDING DATE OF PUBLICATION.

ASSISTANT CHIEF CHEMIST

NEEDED FOR SINGLE-PLANT CEMENT COMPANY LOCATED IN NORTHEASTERN U. S. PREFER APPLICANTS UNDER 40 YEARS OF AGE. QUALIFICATIONS SHOULD BE SUFFICIENT TO ASSUME POSITION OF CHIEF CHEMIST WITHIN A REASONABLE TIME. REPLIES, WHICH WILL BE KEPT CONFIDENTIAL, SHOULD INCLUDE DETAILS ON EXPERIENCE, TRAINING, AGE AND OTHER PERTINENT DATA. OUR EMPLOYEES KNOW OF THIS ADVERTISEMENT.

BOX NO. PQ-204 c/o PIT AND QUARRY PUBLICATIONS
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An old established concern covering Eastern Seaboard requires the services of a man well experienced in the buying and selling of used contractors and road machinery, on a profit sharing basis. Replies confidential.

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ENGINEERS
SALES — PRODUCT DESIGN

Major heavy machinery manufacturer, located Midwest, has excellent opportunities for mechanical design engineers experienced in research and development and in new product design of machinery used in mining, crushing, cement and basic processing industries. Also sales engineers who have experience in this industry or in sales of heavy machinery. Exceptionally fine working conditions and opportunity for future. Write, stating education, experience, present employment, personal data and salary expected. Replies confidential.

BOX NO. PQ-203, c/o PIT AND QUARRY PUBLICATIONS
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COMPLETE BRIQUETTING PLANT

One complete 6-ton per hour Briquetting Plant complete with No. 920 "Clearfield" mixer, alloy steel roll briquette machine, skip hoist, troughing conveyors, and bucket elevator. All equipment includes drives, motors, and starting equipment, condition good.

BOX NO. PQ-407, c/o PIT AND QUARRY PUBLICATIONS
431 S. Dearborn St. Chicago 5, Illinois

Quarries
Crushing Plants
Cement Plants
Storage Methods
Operating Costs

E. Lee Heidenreich, Jr.
Consulting Engineer

75 Second St.
Newburgh, N. Y.
Phone: 1828

9 South Clinton St.
Chicago 6, Ill.
Ph. FR 2-4186

Operation
Plant Layout
Design
Construction
Appraisals

WANTED

Representative for Texas, Oklahoma, Arkansas and Louisiana or portions thereof, experienced in selling screen cloth or servicing vibrating screens. We have an established business for full line of abrasion resisting screen cloth for use in steel mills, sand, gravel and stone plants. Manufacturers of the well-known "WABBLY WEAVE," the only non-plugging cloth on the market. Want either an organization or an individual.

HARRISTEEL PRODUCTS COMPANY
420 Lexington Avenue
New York 17, N. Y.

Chemical engineer, 17 years experience in wet and dry cement plants. Desires supervisory position in either production or chemical control. Will go anywhere.

Box No. PQ-207 c/o Pit and Quarry
431 S. Dearborn St. Chicago 5, Ill.

PRECISION CHEMICAL ANALYSIS OF RARE AND COMMON MINERALS, ORES AND CONCENTRATES. CARBONATE, PHOSPHATE AND SILICATE ROCKS.

H. J. HALLOWELL
Consulting Chemist
323 Main St. Danbury, Conn.

WANTED TO LEASE

The Ivy River Sand Co., Marshall, N.C.
To some reliable Co. Railroad siding nearby.
For information call or write
KNOX BRIGMAN
Marshall, N. C.

CEMENT PLANT ENGINEER

Established engineering company has opening in its engineering department for Staff Consultant with thorough knowledge and experience in the engineering design of modern Portland cement mills.

Applicant should thoroughly understand the problems of conveying, storing, reclaiming, crushing, grinding, rock beneficiation, burning, classifying, and other unit operations, and wet and dry unit processes for the complete manufacture of Portland cement. He should have knowledge of both capital and operating costs, and be familiar with raw material and energy demands. He should be able to develop the material, energy and heat balances for a prospective plant of stated size and type, and specify and select the machinery and equipment required to attain a given production level.

Duties will consist largely of providing top level engineering and guidance for project engineers, with a moderate portion of time spent on contract development and sales. Experience in other rock product industries will be helpful, but not essential. Location will be in Company's home office in large Mid-Atlantic city. Salary open, commensurate with experience. All replies treated confidentially. Please write:

BOX NO. PQ-404
c/o PIT AND QUARRY PUBLICATIONS
431 South Dearborn Street Chicago 5, Illinois

Owner retiring from active business will sell the following equipment:

Bay City shovel #4602—model 25; with trench hoe & shovel front with ½ yd. buckets; enclosed cab; crawler treads; Hercules gas driven engine.

1948 Reo dump truck, 4 yd. body; 1945 Reo dump truck, 5 yd. body.

40 H.P.—G.E. motor, 1170 R.P.M., 60 cycle, 3 phase, 220 volt, 800 amp., 3 pole entrance switch (new). Cross the line starting box, 5 to 10 H.P., 25 to 60 cycle, 220 volt, 3 phase.

H. M. HOGAN
1 Locust Ave., Cortland, N.Y., R.D. #1
Telephone S K 6-8173 Cortland

Save time... assure Profits with ECA REBUILT EQUIPMENT

Partial list only. If what you need isn't listed please contact our nearest plant. No obligation.

AIR COMPRESSORS, ELECTRIC & DIESEL

360′ Ing. Rand Mdl. 75 MH, 75 HP 3/60/440 motor, starter.

160′ Davey, 35 HP 3/60/220, V-belt drive, skids, starter.

105′ Davey, 25 HP 3/60/220, steel frame.

315′ NEW Chicago Pneumatic, Cat. D-8800 Diesel engine, mtd. 4 spring suspended pneu. tires. Sacrifice $6,500.00 f.o.b. our Chicago Plant.

CAR PULLERS

Mead Morrison drum type, 7½ HP and 15 HP, 3/60/220; two units—4200# to 15,000# linepull.

CRANES, CRAWLER

1½ yd. P&H 655-A Diesel Crane or Dragline, 75′ boom, 20′ jib, hi gantry, Cat. D-13000 Diesel eng.

1½ yd. Mdl. 77 Lorain #9163, D13000 Cat. Diesel, 45-85′ boom, 20′ jib, wt. 40 ton.

Mdl. 501 Koehring #1071, 60-70-80′ boom, 18′ jib, Mdl. K Wisc. gas eng., 20 ton @ 12′. Wt. 97,200#.

¾ yd. Mdl. 304 Koehring #C5934, 35-50′ boom.

Mdl. 255A P&H #8243, 30-40′ boom, Chrysler 8 cyl. gas eng., cap. 16,900#.

CRANES, LOCOMOTIVE

30 ton Mdl. F OHIO #3266, 50′ boom, oil fired, Natl. Bd. 200# boiler, beautiful shape; good buy.

DERRICKS

4 ton Ingram Steel Stiffleg, for hook work, 23′8″ mast, 50′ boom, cap. 4 ton @ 28′, tested to 8 ton.

20 ton American Terry Steel Erectors Guy Derrick, 110′ mast, 100′ boom.

HOISTS, STEAM

11x12 3/drum American, steel gears, 2 clutch winch heads, wt. approx. 13 ton, rated 15,000# single line.

8½x10 2/drum Lambert, drums 14 x 25x7″.

9x10 2/drum Lambert, drums 14x 24x7½″.

THIS MONTH'S SPECIALS
DRAGSCRAPER HOISTS

American 2/drum 2-speed Dragscraper Hoists, 125 HP 3/60/220 slipring, steel gears. Rear drum 18,750# @ 200 FPM or 6600# @ 570 FPM. Front drum 37,500# @ 100 FPM or 14,000# @ 270 FPM. Wt. 19,200#. Beautiful shape.

10½x12 2/drum Lambert; one drum 24x34x8″ with line pull 9,000#; other drum 16x24x11″ line pull 13,000#.

PUMPS, ELECTRIC

12″ Dayton Dowd, vert. 50 HP, 3/60/220/440, 6000 GPM @ 19′, 4250 GPM @ 32′.

4″ suc., 3″ dis. Weinman 7½ HP 3/60/220/440, 420 GPM @ 40′.

3″ Worthington 2 stage centrif. pump, 25 HP 440/3/60, 200 GPM @ 127′ head.

CLIFTON HGTS., PA.
Box P-608
Sub. of Phila.
MAdison 6-2200

CHICAGO 12, ILL.
1160 S. Washtenaw
NEvada 8-2400

ECA
EQUIPMENT CORPORATION OF AMERICA

PITTSBURGH 30, PA.
Box P-923
FEderal 1-2000

NEW YORK 7, N.Y.
30-P Church St.
Worth 2-0036

A LARGE AUCTION!

CRUSHING — ASPHALT — EARTHMOVING EQUIPMENT

MONDAY,
MAY 16th
8:30 A.M. (MST)

DENVER, COLORADO

At the Monaghan yard, in NE part of Denver (Derby, Colo.), East 64th Ave. and Kearney; Each-Piece-Positively-Sells-to-the-Highest-Bidder-Without-Any Limit-Minimum-or-Reservation!! A complete dispersion of the J.H.-N.M. Monaghan Construction Co. WRITE — WIRE — CALL auctioneers for complete sale bill!!!

CEDAR RAPIDS Master Crusher, a complete portable plant mounted on 10:00x20 dual tandems, air brakes, transports for feed and delivery conveyors, sand attach, heavy rock feeder 36″ x 8′ type, 30″ x 3′ feeder, C-R type conveyor 18″ x 35′ w/pneumatic tire transports new in late '52, very good.

PIONEER Primary crusher Model 2036 jaw crusher, type C apron feeder, Cat D-13000 engine, mounted on 10:00x20 dual tandems, been practically all rebuilt except Cat engine and not used since.

CEDAR RAPIDS 50′ x 30″ conveyor, complete; Pioneer reciprocal feeder; 15″ Grisley; Lorain 2 yd model 820-K crane-drag complete.

BUCYRUS ERIE 54B shovel, complete; B-E 54B 70′ crane-drag boom; Hendrix 2 to 4 yd. drag buckets; Caterpillar D-4 w/Austin overshot loader, 751 hrs.

Eleven IHC 1953 model 210-11 heavy duty dump trucks, 15,000 front axles, 36,000 bogies, 30-31 Brown-Lite transmissions, Anthony 10 yd steel beds, excellent.

Ten GMC 1952 tandem model 620 trucks w/ Anthony or Heil 10 yd steel beds, w/dual hoists, 28,000 Eaton bogies, 8,000 front axles, very good.

Two '52 and 1 '51 White tandem dump trucks, complete; 22 other trucks and pickups; floats; trailers.

Fourteen D-8 tractors; PIONEER NUMBER 101 CENTRAL HOT MIX ASPHALT PLANT, complete, diesel power, used 2 seasons; much other asphalt equipment.

TWO EUCLID MOTOR SCRAPERS; 2 CATERPILLAR DW-20's; 7 CATERPILLAR DW-10's w/Cat bottom dump wagons; 3 EUCLID 65FD rear end dumps; 3LeT model W scrapers.

Euclid loader; 7 Cat No. 12 patrols; Cat elevating grader; G-D approx 686 cfm compressor; G-D approx 445 cfm compressor; large scales; rippers; steam cleaners; lite plants; pumps and many other items.

INSPECT the equipment at any time!!!
ALMOST EVERY PIECE IS IN A-1 condition, very, very good!!!
WRITE — WIRE — CALL Auctioneers for complete sale bill!!!
EACH PIECE POSITIVELY SELLS TO THE HIGHEST BIDDER WITHOUT LIMIT, MINIMUM OR RESERVATION!!!

J. H. - N. M. MONAGHAN CONSTRUCTION CO., OWNER
Ph. Atlas 82694 Denver, Colorado

FORKE BROTHERS
the Auctioneers
321 Sharp Bldg. **Lincoln, Nebraska** Phone 2-1045

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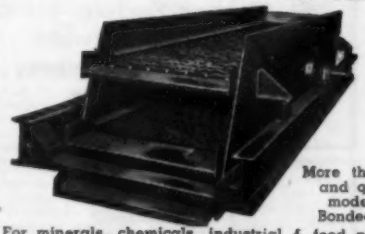
FOR BULK MATERIAL HANDLING & PROCESSING

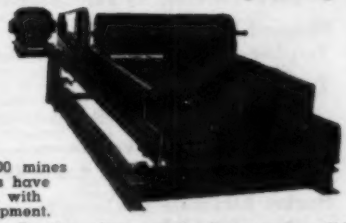
WRITE, WIRE OR PHONE - IMMEDIATE SHIPMENT FROM STOCK

Save up to 50%. Buy now before advancing labor and material costs force us to increase prices

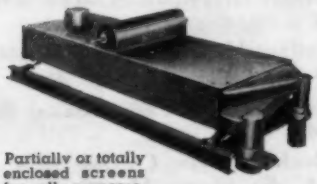
NEW BONDED® HEAVY DUTY VIBRATING SCREENS

"For Continuous, Economical Screening of High Tonnages"





More than 5000 mines and quarries have modernized with Bonded equipment.



Partially or totally enclosed screens for all purposes.

For minerals, chemicals, industrial & food products. To size, clean, grade & separate solids from liquids. De-watering & de-aerating of liquid foods, tomato products & fruit juices. For rendering, asphalt, lime, sintering & gypsum. Also made in stainless steel, alloy & other metals. Open or enclosed models available for hot materials or when dust & flying particles need be contained. For almost any type of screening operation, wet or dry. Heavy duty models are 4-bearing, positive throw eccentric shaft type, 3'x8' to 5'x14', 1 to 5 decks. Other models have eccentric weight mechanism, spring mounted, 1 to 3 decks, from 2'x4' to 3'x8'.' All models low priced, with minimum maintenance & power consumption. Heavy Duty Screens from .....$1095.00 General Purpose Screens from $395.00

NEW BONDED® TROUGHING IDLER CONVEYOR BARGAINS

Complete Ready-Fab sections quickly and easily joined together on the job. We take our loss on our stock of short length belting. You can save as much as 50% on the BONDED CONVEYOR SPECIALS listed, with conveyor belting in two pieces. Conveyors are equipped with 5" roll diam. idlers and return rolls, 20" diam. head pulley and 16" diam. tail pulley mounted on 2¼" or 2-7/16" diam. shaft. Belt is new 4-ply, 28 oz. duck, ⅛" top rubber cover x 1/32" bottom cover and is fresh stock made by leading manufacturers.

Remember, You Save Up To 50%

CONVEYOR PRICES INCLUDE BELTING

Belt Width	Length of Conveyor	List Price	Sale Price
16"	20'	$ 991	$ 548
16"	45'	1785	937
16"	60'	2309	1170
16"	85'	3102	1558
18"	25'	1229	684
18"	45'	1839	1095
18"	60'	2384	1254
18"	85'	3209	1665
18"	100'	3704	1912
24"	25'	1322	773
24"	45'	2062	1145
24"	60'	2617	1426
24"	100'	4097	2166
24"	130'	5207	2773
30"	25'	1421	847
30"	65'	3101	1718
30"	85'	3731	2144

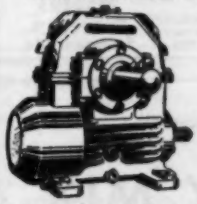
Other lengths & belt widths at bargain prices.

LONGER CONVEYORS WITH EXTRA FEATURES

In addition to features described at left these conveyors include Gravity Takeup, Lagged Head Pulley, Self Cleaning Wing Tail Pulley. Head Shaft & Bearings 2-15/16". Tail Shaft & Bearings 2-7/16". Side Guide Idlers—(1 pr. each for Head & Tail.) Snub Roll at Head and 12-3/4" diam. using 1-15/16" shaft & bearings. Ratchet & Pawl Holdback. Return belt cover at slight extra cost.

Belt Width	Length of Conveyor	List Price	Sale Price
18"	150'	$ 6209.00	$ 3507.00
18"	200'	7859.00	4336.00
18"	250'	9509.00	5164.00
18"	300'	11.159.00	5993.00
24"	150'	6820.00	3949.00
24"	225'	9595.00	5356.00
24"	300'	12.370.00	6763.00
30"	150'	7864.00	4479.00
30"	220'	10.604.00	5971.00
30"	300'	13.964.00	7677.00

NEW BONDED GEAR REDUCERS



HP	Ratio	Price
3	20:1	$ 81.00
5	20:1	142.00
10	20:1	228.00
15	20:1	286.00
2	30:1	81.00
3	30:1	142.00
5	30:1	228.00
7½	30:1	228.00
10	30:1	286.00
15	30:1	394.00

Reducers are right angle with worm on bottom (underdriven) and all models are fan cooled. Other sizes and ratios available at bargain prices.

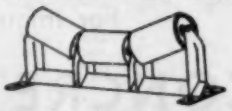
NEW CONVEYOR BELTING SAVE UP TO 28%

Heavy duty 4-ply, 28 oz. duck, 1/8" top rubber cover x 1/32" bottom cover rubber belting having high tensile strength, tough cotton duck, strong carcass and proper flexibility. For heavy boxes, bags and bulk materials. Troughs easily. Famous brands at deep cut prices. Fresh stock.

Width	List Price	Sale Price
14"	$3.23 foot	$2.50 foot
16"	3.84 foot	2.82 foot
18"	4.03 foot	2.90 foot
20"	4.42 foot	3.35 foot
24"	5.23 foot	3.76 foot
30"	6.39 foot	4.60 foot

Additional width and plies available at low prices. Write for free sample.

NEW IDLERS & RETURN ROLLS 25% BELOW LIST PRICE



3-roll, 5" diameter Troughing Idlers for

16" belt	$17.25	30" belt	$19.50
18" belt	18.00	36" belt	20.25
24" belt	18.75	48" belt	21.75

1-roll, 5" diameter Return Idlers for

16" belt	$ 6.75	30" belt	$ 8.25
18" belt	7.13	36" belt	8.75
24" belt	7.50	48" belt	10.25

All steel. Interchangeable with other well-known makes. Replaceable ball bearings. Either sealed type (pre-lubricated) or with alemite fittings. Rust proof ball races. Maintenance is negligible.

BUILD YOUR OWN CONVEYOR WITH NEW PARTS

Ready-Made Head, Tail and Intermediate Conveyor Sections
All Types Idlers, Return Rolls, Belting, Reducers and Motors in Stock

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Head & Tail $171.00

Roll Idler $6.38

Self-Aligning Idler $56.50

Guide Idler $13.75

Wing Pulley $74.00

NEW MOTOR TRUCK SCALES

For stationary and portable applications. Scales have steel lever system complete with structural steel weighbridge. Capacities to 50 tons. Recording beams available.

20 Ton Truck Scales $525.00
26 Ton Truck Scales 782.00

NEW CHAIN CONVEYORS

Heavy Duty Flight Conveyor

Any length. Flights up to 8"x24". All welded structural and sheet steel. Heavy duty, double guided chain. Priced from....$421.00

Mobile Tire-Mounted Drag Chain Conveyor

Mounted on rubber tires and adjustable undercarriage. Priced from....$741.00

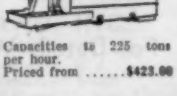
NEW CINDER PUMICE, PERLITE CRUSHERS

Bonded double roll crushers: For crushing cinders, lightweight aggregate, pumice, perlite, chemicals and similar materials.

Capacities to 100 tons per hour. Steel hoppers included. Priced from $479.00

NEW RECIPROCATING PLATE AND PAN FEEDERS

For controlled feed of aggregates, sand, gravel, crushed stone, cinders, heavy rock and almost any other bulk material.



Capacities to 225 tons per hour. Priced from $423.00

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Jeffrey Hammer Mills, 18 x 24

Fuller Lehigh Mill, 42″ dia.

Harding 8′D x 60″ Conical Ball Mill

Buchanan Jaw Crusher 10 x 16

36″ dia. Electro Magnet

L-B Skip Hoist, 48 TPH

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L-B Crawler Crane 1¼ yd. Bkt.

Osgood Crawler, ½ yd. Shov.

Shepard-Niles 4 ton Monorail Telpher Cranes with ¾ yd. bkts.

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Pan or Apron Conveyors — 36′, 85′ x 150′ long

Bucket Elevators (18) 20′ to 60′ high

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EUCLID REAR DUMP TRUCKS

model 1055 P & H shovel 3½ yd.
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model 120-B BUCYRUS-ERIE shovel 5 yd.
model 170-B BUCYRUS-ERIE shovel 6 yd.
model 5-W BUCYRUS-ERIE dragline 6 yd.
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BUDA 150 DIESEL MOTOR and Drives with 24 UNIVERSAL CRUSHER with $800.00 new parts for ROLL OR CONE CRUSHER. Also want 1½ YARD DRAGLINE bucket.

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30 HP 200# Erie City Boiler—Excellent
44 Ton Diesel; 25 Ton Gas Locomotives
DRXB & DFXD Hercules Diesel Engines
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SHOVELS, ELECTRIC: 3, 4, 5 and 6½ yd., Marion Bucyrus-Erie, P. & H., 3 phase, 60 cycle, 2200/4000 volt.

COMPRESSORS: 2—Ingersoll Rand PRE-2, 14 x 22 x 16, 264 H.P., 225 RPM, 2200 volt, synchronous motors. Chicago Pneumatic OCB, 1044 CFM, 200 H.P., 440 volt, 3 phase, 60 cycle.

BLAST HOLE DRILLS: Bucyrus Erie 42-T with 9" bit and tools, hydraulic jacks, diesel and electric drives. Ingersoll Rand Quarrymaster, diesel powered. Joy Champion electric.

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OVERHEAD ELECTRIC CRANES: Whiting 8 ton, 54' span, 4 motor, clamshell bucket operating, 440 volt, 3 phase, 60 cycle. Several other cranes, A.C. and D.C., various spans, 5 to 150 tons, 3 and 4 motor.

LOCOMOTIVE CRANE: 25 ton capacity, standard gauge, gasoline powered, cast steel trucks, air brakes, with or without 1¼ yd. Williams clamshell bucket, thoroughly modern, excellent condition. Located Minnesota. For sale or rent.

LOCOMOTIVES: 2—65 ton diesel electric, standard gauge, thoroughly modern, excellent condition. For sale or rent.

MINE HOISTS: Single and double drum, 100 to 1500 H.P., with all electric equipment. Complete specifications, drawings and photos available.

HOIST MOTORS: 300 H.P., 435 RPM. 600 H.P., 710 RPM. 400 H.P., 588 RPM. 1200 H.P., 444 RPM. 2200 volt, A.C., with controls.

SCREEN: Tyler Hummer type V-50, 4'x5', double deck, fully enclosed, with Thermionic power converter. Guaranteed condition.

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KILNS: 2—Rotary 7' x 110', 9/16" shell, excellent condition.

JAW CRUSHERS: 48x60", 42x40", 36x48", 18x30", with or without motors and drives. Other sizes from 4x6" up to 48x60".

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GOOD USED PORTABLE LOADERS AND CONVEYORS
Gasoline and electric models. Belt and drag type. Various lengths and capacities.
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JAW CRUSHERS—7" x 12" up to 48" x 60".
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GYRATORY CRUSHERS—23 up to 212. Also one 6", 10", 16" & 20" Superior McCully gyratory crusher.
4½' x 40, 7 x 120, 8 x 125' Kilns.
DIRECT HEAT ROTARY DRYERS—6' x 40', 4½' x 30', 11' x 75', 8' x 123'.
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222-332 Allis-Chalmers type B Hydrocone Crushers.
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28—Trane & Grinnell Unit Heaters.
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14—Feed Rolls up to 36"x36".
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6—Ore Skips.
4—Man Cages.
1—Ross Feeder.
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1—22"x14" Sturtevant Roll
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2—32"x36" Edison Roll
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7—4'x5' Hummer, type V16, 32, & 68.
8—Hummer, type 400, 4'x8'.
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3—12 KVA, 15 cycle MG Sets.

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1—6'4½" Dia. x 12' L. Link Belt, Roto Louvre Dryer with Maehler oil heater.

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10—Wilfley, 2" to 4".
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27—Addt'l. pumps, Centrifugal, Triplex, Vacuum, & Sump, up to 5650 GPM.

CONVEYORS

29—SCREW, 6" to 24" D., 10' to 129' L.
29—BUCKET ELEVATORS, Belt and Chain Types, 25' to 100' high, Bucket Size from 6"x4" to 22"x19".
43—TROUGHING BELT, 14" to 18" wide, 22' to 124' lengths.
15—FLIGHT (SCRAPER), 24" to 36" wide, 25' to 171' lengths.
1—75', 16" Pan Conveyor.

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3—#3 Roots
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Diesel Engine, 2—6 Yd. Dragline Buckets, 120' Boom. Machine rebuilt throughout. Excellent Condition. Price $80,000.00
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SLIP RING MOTORS
3 phase, 60 cycle, 220 or 440 volts
(*2300 volts or higher)

H.P.	Make	Type	Speed
2000	*G.E.	MT	600
1500	*G.E.	MT-30	240
1250	*Westg.	CW	600
1200	*G.E.	MT-24	300
1000	*Westg.	CW	250
700	*Al-Ch.	ANY	720
600	G.E.	MT-567	1800
600	*Westg.	CW	450
500	G.E.	I-17A	900
500	Westg.	CW	350
400	Al-Ch.	3 brg.	450
400	*G.E.	MT-412	450
300	*G.E.	IE-15A	1800
300	*G.E.	MT-568	720
250	Westg.	HF-15H	600
250	*G.E.	I-17B	450
200	G.E.	IK-15B	900
200	G.E.	IM-17	600

SQUIRREL CAGE MOTORS
3 phase, 60 cycle, 220 or 440 volts
(*2300 volts or higher)

H.P.	Make	Type	Speed
1250	*Al-Ch.	ANW	3600
1250	*Al-Ch.	ANW	1200
800	*Westg.	CS	3600
800	*Westg.	CS-1485	1800
700	*Westg.	CS	1200
700	Al-Ch.	AN	900
500	*Al-Ch.	6316-SW	1800
500	G.E.	Kt-424	450
400	G.E.	KF-539	3600
400	G.E.	KT-424	360
350	Ideal	A	1800
300	G.E.	K-6344Y	1200
300	G.E.	K-6353 TEFC	720
250	G.E.	KT-559S	1800
250	Westg.	CS875S	1800
250	*L-Allis	OGK-148	720
250	*G.E.	IK	600

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MARION 93-M 2½ yard Diesel shovel with a D-17000 Cat. engine, 7 years old, in good condition for $25,000 at Buffalo, New York.

MARION 93-M 2½ yard Diesel shovel located at Martha, Tennessee, is a good buy for $22,500. This machine is 7 years old.

MARION 362 1½ yard shovel, about 5 years old and in very good condition, can be bought for $23,500, which includes a brand new 50-foot boom with dragline attachments. Located in Marysville, Tennessee.

Contact your nearest Marion-Osgood-General Distributor, or

Marion Power Shovel Co.
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Model 305 Pioneer washing plant complete with 1020 jaw crusher, bunker screen, hopper, feeder, conveyor, motors, electric panel board, piping, and 4 inch Jaeger electric pump. This equipment nearly new used only eight months . . . Price $17,000.00. Call or write:

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Phone Lexington 9-6035

FOR SALE

1—8′ x 123′ dryer.
1—36″ x 16″ Sturtevant crushing rolls.
2—24″ x 14″ Rogers Iron Works crushing rolls.
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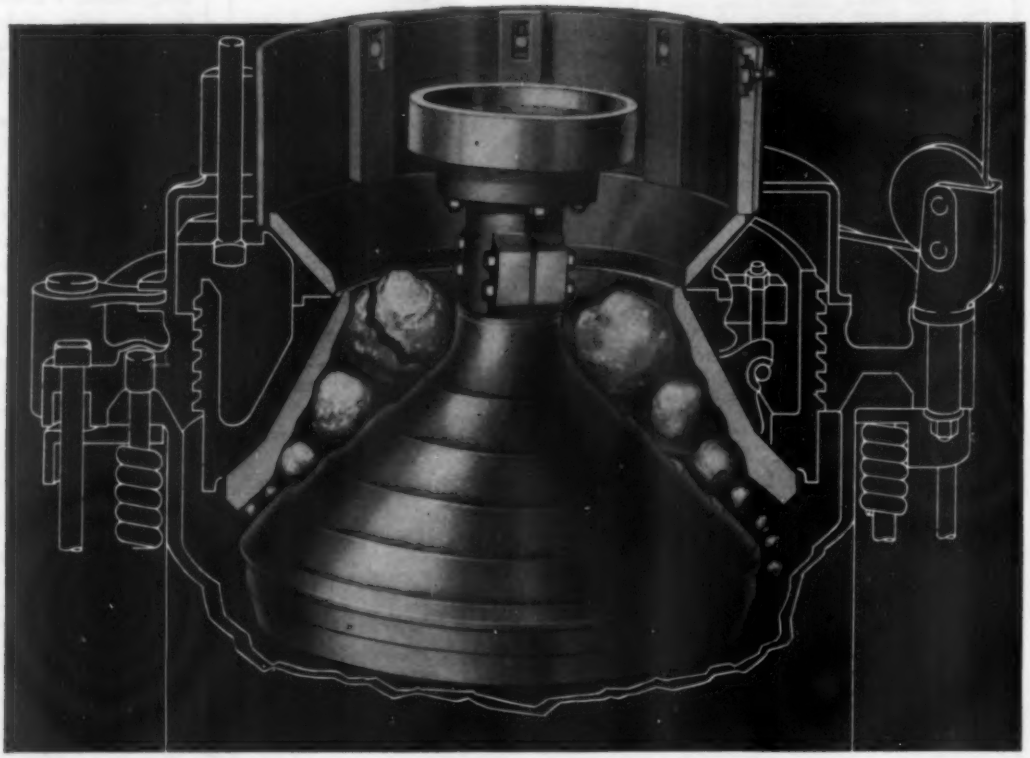

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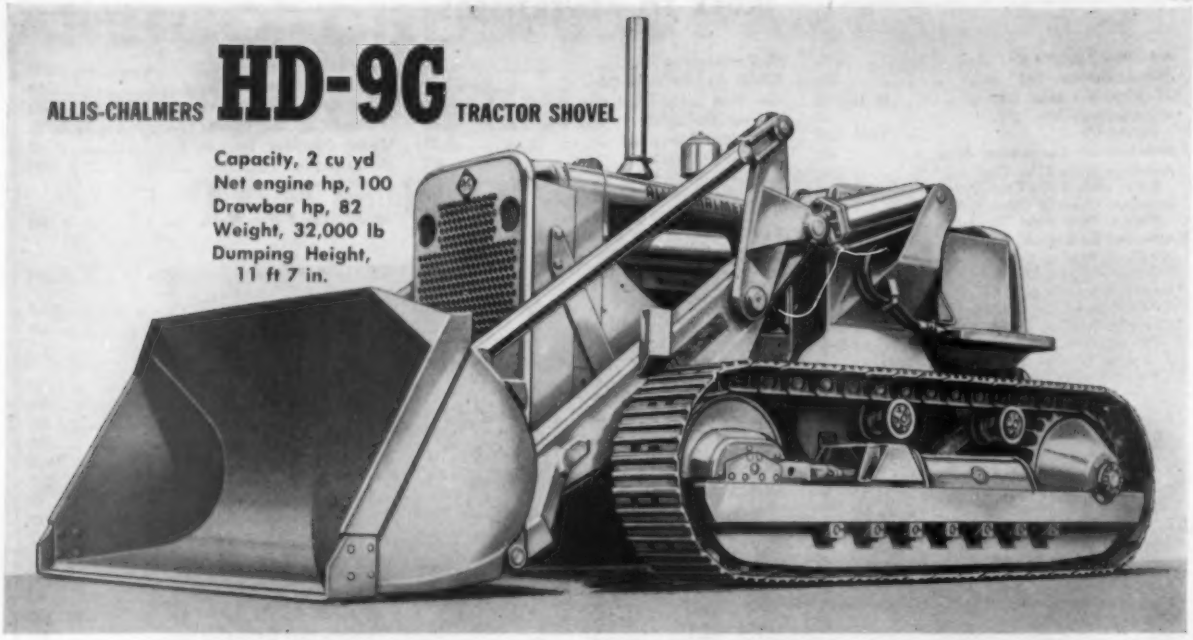

POPULAR 2-YD HD-9G TRACTOR SHOVEL NOW OFFERS

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Design refinements in the Allis-Chalmers HD-9G now make it even more productive than ever. First, the net engine output has been increased to 100 hp, with 23,000 lb of push for extra crowding and digging ability, fast work cycles.

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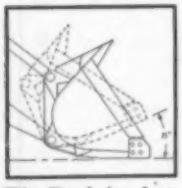

A new addition to the wide variety of attachments available for the HD-9G Tractor Shovel is the Tip-Back bucket which allows the operator to roll the bucket back approximately 25° at ground level. Ideal for handling greater capacities of loose stockpiled materials, the Tip-Back bucket can be carried lower to the ground for greater stability . . . can load bulky objects easier.

New-type ceramic master clutch lining reduces lever pull, makes it easier for the operator to do more. The new HD-9G helps the operator do more in other ways, too — giving him full vision, fast and easy control, cleaner platform and more comfortable seat from which to work, and more working time with truck wheels, support rollers and idlers that need greasing only once every 1,000 hours.

Lower Operating Cost

Design improvements also add longer life to the HD-9G under all work conditions. Heavy box-section booms are 50 percent stronger, assuring proper alignment even working in the toughest materials. The low design of the new HD-9G combination stabilizer and cowl not only offers easy accessibility for maintenance and service, but contributes to maximum operator vision. New ceramic master clutch lining operates longer between adjustments, increases clutch life.

Hydraulic system provides new maintenance simplicity, safety of operation, as well as improved visibility. With new-style tank, there are few external fittings, greatly reducing possibility of outside leaks. Magnetic filters and suction-line screens protect the entire system from damaging grit. New, improved hydraulic pump is designed for long life as well as fast and accurate bucket action.

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ALLIS-CHALMERS
TRACTOR DIVISION — MILWAUKEE 1, U. S. A.

Farval helps keep walking dragline working —no lost time for lubrication

FARVAL—
Studies in Centralized Lubrication
No. 168

LUBRICATION requirements of this giant walking dragline are as complex as the machine itself. It was a tough problem to solve, but a planned Farval Centralized Lubrication System did it. Now, Farval helps keep the dragline working uninterruptedly with minimum time for lubrication.

The entire walking machinery needs a fresh supply of lubricant about every five steps—length of each step is 6 feet 2 inches. Hoisting, dragging and swinging machinery require lubricant on an 8-hour basis. 108 rollers in a roller circle that supports and permits rotation of the control house, require lubrication once every 24 hours. All told, 206 bearings require regular lubrication.

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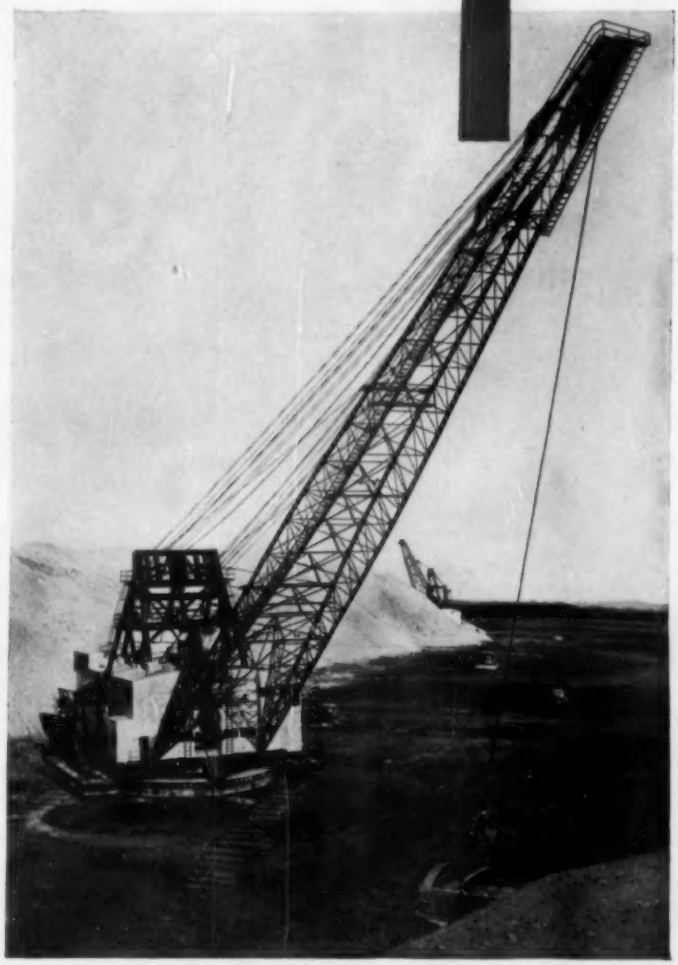
If you have an equipment lubrication problem, simple or complex, it will pay you to find out how a Farval Centralized Lubrication System can save you time, money and lubricant. Farval delivers oil or grease unfailingly, in the exact amount required when needed, to each bearing served. It can be installed on new or old equipment, often pays for itself in a few weeks or months. Thousands of Farval installations are improving lubrication and operations in practically all industries. Find out how Farval can help *you*. Write for technical advice and ask for Bulletin 26. The Farval Corporation, 3280 East 80th Street, Cleveland 4, Ohio.

Affiliate of The Cleveland Worm & Gear Company, Industrial Worm Gearing. In Canada: Peacock Brothers Limited.



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